

Receipt Number

562 870

EX-A-J  
175UNITED STATES DISTRICT COURT  
FOR THE EASTERN DISTRICT OF MICHIGAN  
SOUTHERN DIVISION

ePrize, LLC

Plaintiff,

vs.

APPLIED INTERACT, LLC

Defendant.

Case: 4:07-cv-14338

Assigned To: Gadola, Paul V

Referral Judge: Morgan, Virginia M

Filed: 10-11-2007 At 04:12 PM

CMP ePRIZE LLC VS APPLIED INTERACT  
LLC (LH)

JURY TRIAL DEMANDED

**COMPLAINT**

Plaintiff, ePrize, LLC ("Plaintiff" or "ePrize"), states as its Complaint against Defendant, Applied Interact, LLC ("Defendant" or "Applied Interact") as follows:

**BACKGROUND**

1. ePrize is a Michigan company that provides advertisers with internet-based interactive promotions such as online sweepstakes and points-based loyalty programs. These interactive promotions allow advertisers to create a unique one-on-one relationship with their customers. Since 1999, ePrize has launched over 3,500 promotions for some of the top advertisers in the country. ePrize is obligated to indemnify its advertiser customers against suits for patent infringement resulting from ePrize promotions.

2. Applied Interact claims to be the exclusive licensee of a number of patents issued to Dr. Henry Von Kohorn. Upon information and belief, Applied Interact sells no products and does not practice any of the Von Kohorn patents. Rather, Applied Interact derives all of its revenue from licensing the Von Kohorn patents and from lawsuits against businesses that will not license the Von Kohorn patents.

3. Applied Interact has sent letters to numerous ePrize advertisers alleging that the advertisers' use of ePrize-provided sweepstakes infringes U.S. Patents 5,508,731 (the "'731 Patent") and 5,249,044 (the "'044 Patent"). True and correct copies of the '731 and '044 Patent are attached as Exhibits A – B. The threatening letters have been sent to at least the following ePrize advertisers: J.C. Penney Corp., Inc. ("JC Penney") (Exhibits C – D); Best Western International, Inc. ("Best Western") (Exhibit E); The Bombay Company ("Bombay") (Exhibits F – G); Bluefly, Inc. ("Bluefly") (Exhibit H); and SmartBargains.com LP ("SmartBargains") (Exhibits I – J) (collectively, the "ePrize Indemnitees").

4. A first set of Applied Interact threat letters allege that Applied Interact has the exclusive right to license the '731 and '044 Patents, chronicle past litigation brought by Applied Interact to enforce those patents, and give the ePrize Indemnitees the "choice" of paying for a license, terminating their use of ePrize sweepstakes, or having Applied Interact "refer this matter to our outside litigation counsel." (Exhibits C, E, F, I). A second set of Applied Interact threat letters state that "we recently settled patent infringement litigation with Southwest Airlines, Overstock.com and Primedia," and offer a license having "a covenant not to sue for infringement of any of Applied Interact's patents, achieving total peace between the parties." (Exhibits D, G, H, J).

5. ePrize reasonably apprehends that the ePrize Indemnitees will be sued by Applied Interact, invoking ePrize's indemnity obligation. As the provider of the sweepstakes that allegedly infringe the '731 and '044 patents, ePrize also reasonably apprehends that it will be sued by Applied Interact for alleged direct or indirect infringement of the '731 and '044 Patents. An actual and justiciable controversy exists between Applied Interact and ePrize concerning whether the '731 and '044 Patents are invalid and are not infringed by ePrize. At this time,

declaratory relief is appropriate so that the parties may ascertain their rights and duties in relation to the '731 and '044 Patents.

### **PARTIES**

6. Plaintiff ePrize is a Michigan limited liability company with its principal place of business at One ePrize Drive, Pleasant Ridge, MI 48069.

7. Defendant Applied Interact is a Delaware limited liability company with its principal place of business at P.O. Box 366, New York, New York 10018-9998.

### **JURISDICTION AND VENUE**

8. Plaintiff seeks a declaratory judgment under 28 U.S.C. § 2201 of non-infringement and invalidity of the claims of the '731 and '044 Patents under 35 U.S.C. § 271 and 35 U.S.C. § 282. This Court has original and exclusive subject matter jurisdiction over these claims under 28 U.S.C. § 1331 and § 1338 (a).

9. This Court has personal jurisdiction over Defendant pursuant to MCL § 600.711 and MCL § 600.715.

10. Venue over this action is proper under 28 U.S.C. § 1391 and 28 U.S.C. § 1400.

### **CLAIMS FOR RELIEF-DECLARATORY JUDGMENT**

11. The '731 Patent, titled "Generation of Enlarged Participation Broadcast Audience" issued on April 16, 1996 with Response Reward Systems, L.C. as the assignee. (Exhibit A). Defendant Applied Interact purports to own the exclusive right to license the '731 Patent and has filed infringement lawsuits based on the '731 patent.

12. The '044 Patent, titled "Product Information Storage, Display, and Coupon Dispensing System" issued on September 28, 1993 with Response Reward Systems, L.C. as

the assignee. (Exhibit B). Defendant Applied Interact purports to own the exclusive right to license the '044 Patent and has litigated infringement lawsuits involving the '044 patent.

13. In a letter dated November 1, 2006, Applied Interact contacted ePrize Indemnitee J.C. Penney. The letter discusses previous lawsuits filed by Applied Interact and provides J.C. Penney the "choice" of paying for a license, terminating its use of ePrize sweepstakes, or having Applied Interact "refer this matter to our outside litigation counsel." (Exhibit C). Similar letters were sent to other ePrize Indemnitees on or around November 1, 2006, including Best Western (Exhibit E), Bombay (Exhibit F), and SmartBargains (Exhibit I).

14. In a letter dated September 14, 2007, Applied Interact contacted ePrize Indemnitee J.C. Penney. The letter discusses more lawsuits litigated by Applied Interact and offers a license having "a covenant not to sue for infringement of any of Applied Interact's patents, achieving total peace between the parties." (Exhibit D). Similar letters were sent to other ePrize Indemnitees on September 14, 2007, including Bombay (Exhibit G), Bluefly (Exhibit H) and SmartBargains (Exhibit J).

15. Each of the sweepstakes offerings identified in Applied Interact's letters was supplied by ePrize.

16. ePrize is under a legal obligation to indemnify each of J.C. Penney, Best Western, Bombay, Bluefly, and SmartBargains in the event of the patent infringement litigation threatened in Applied Interact's letters.

17. An actual controversy exists between ePrize and Applied Interact as to non-infringement of the claims of the '731 and '044 Patents. The statements in the referenced letters constitute threats to sue for infringement of the '731 and '044 Patents. These statements have

created a reasonable apprehension on the part of ePrize that ePrize or the ePrize Indemnitees will face an infringement suit.

18. ePrize and the ePrize Indemnitees do not infringe the claims of the '731 Patent.

19. ePrize and the ePrize Indemnitees do not infringe the claims of the '044 Patent.

20. Defendant Applied Interact's claim of infringement is also barred because the '731 Patent and the '044 Patent are invalid under 35 U.S.C. §§ 102, 103 and 112.

#### **ATTORNEYS' FEES**

21. ePrize asserts that this is an exceptional case such that the Applied Interact should be required to pay ePrize's reasonable attorneys' fees in accordance with 35 U.S.C. § 285 and because Applied Interact made its allegations of infringement recklessly, maliciously and without reasonable inquiry or investigation. ePrize also seeks its reasonable attorneys' fees against Applied Interact as a prevailing party under 28 U.S.C. § 2202.

#### **PRAAYER FOR RELIEF**

WHEREFORE, Plaintiff ePrize respectfully requests a judgment from this Court as follows:

- a. a declaration that ePrize and the ePrize Indemnitees have not infringed, and do not infringe any claims of the '731 Patent;
- b. a declaration that the '731 Patent is invalid;
- c. a declaration that ePrize and the ePrize Indemnitees have not infringed, and do not infringe any claims of the '044 Patent;
- d. a declaration that the '044 Patent is invalid;
- e. a finding that this case is exceptional, and ordering Applied Interact to pay ePrize's reasonable attorneys' fees in accordance with 35 U.S.C. § 285 and for Applied Interact's reckless conduct in making such allegations without reasonable inquiry; and awarding ePrize's attorneys' fees and costs as a prevailing party under 28 U.S.C. § 2202; and

- f. awarding ePrize all such other and further relief as is available, at law or in equity, that this Court deems just, equitable, and proper under the circumstances.

**JURY DEMAND**

Pursuant to Federal Rule of Civil Procedure 38(b), Plaintiff hereby demands a trial by jury on all issues triable of right by jury.

Respectfully submitted,

Date: 10-11-07



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A



US005508731A

**United States Patent**

[19]

[11] **Patent Number:** **5,508,731****Kohorn**[45] **Date of Patent:** **Apr. 16, 1996**[54] **GENERATION OF ENLARGED PARTICIPATORY BROADCAST AUDIENCE**[75] **Inventor:** Henry V. Kohorn, Vero Beach, Fla.[73] **Assignee:** Response Reward Systems L.C., Vero Beach, Fla.

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(List continued on next page.)

[21] **Appl. No.:** 25,397[22] **Filed:** Feb. 25, 1993**Related U.S. Application Data**

[63] Continuation-in-part of Ser. No. 763,672, Sep. 19, 1991, Pat. No. 5,283,734, which is a continuation-in-part of Ser. No. 603,882, Oct. 25, 1990, Pat. No. 5,057,915, which is a continuation-in-part of Ser. No. 424,089, Oct. 19, 1989, Pat. No. 5,034,807, which is a continuation-in-part of Ser. No. 192,355, May 10, 1988, Pat. No. 4,926,255, which is a continuation-in-part of Ser. No. 837,827, Mar. 10, 1986, Pat. No. 4,745,468.

[51] **Int. Cl.<sup>6</sup>** ..... H04N 7/10; H04N 7/00[52] **U.S. Cl.** ..... 348/1; 348/12; 348/13; 455/2; 455/5.1[58] **Field of Search** ..... 348/13, 12, 1, 348/3, 5, 14, 20, 10, 8; 358/84, 86; 455/2, 4.1, 4.2, 5.1, 6.3; H04N 7/10, 7/14, 7/00[56] **References Cited****U.S. PATENT DOCUMENTS**

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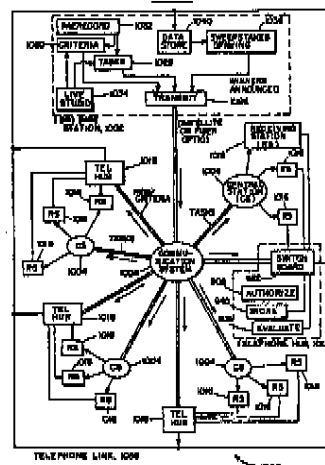
*Primary Examiner*—James J. Groody*Assistant Examiner*—Sherrie Hsia*Attorney, Agent, or Firm*—Perman & Green

[57]

**ABSTRACT**

A system and method for wagering and for evaluating responses to broadcast programs, such as television programs, includes an instructional signal modulated onto a signal transmitted concurrently with the television program, or time-multiplexed with a television. At each of a plurality of remote receiving stations, one or more members of a remote audience has the opportunity to respond to a situation presented in the television program by entering a response on a keyboard. The system includes, at each remote receiving station, a response unit having a memory responsive to the instructional signal for storing acceptable responses, a comparison circuit for comparing responses entered at the keyboard with those stored in the memory, circuitry for scoring responses in accordance with commands from the instructional signal, and a recording device for providing a permanent record of the audience score at the remote station. For conducting a sweepstakes, numbers or other responses are entered at the remote stations and are stored at a central facility for verification. Evaluation of a response may be performed at a central location or by a player's response unit. The program may be presented live conducted by a host at a central station, or by a prerecorded message accessible by telephone from a remote station with regulation from a central station, and may be transmitted via satellite simultaneously to numerous central stations for rebroadcast to an enlarged participatory audience.

199 Claims, 24 Drawing Sheets





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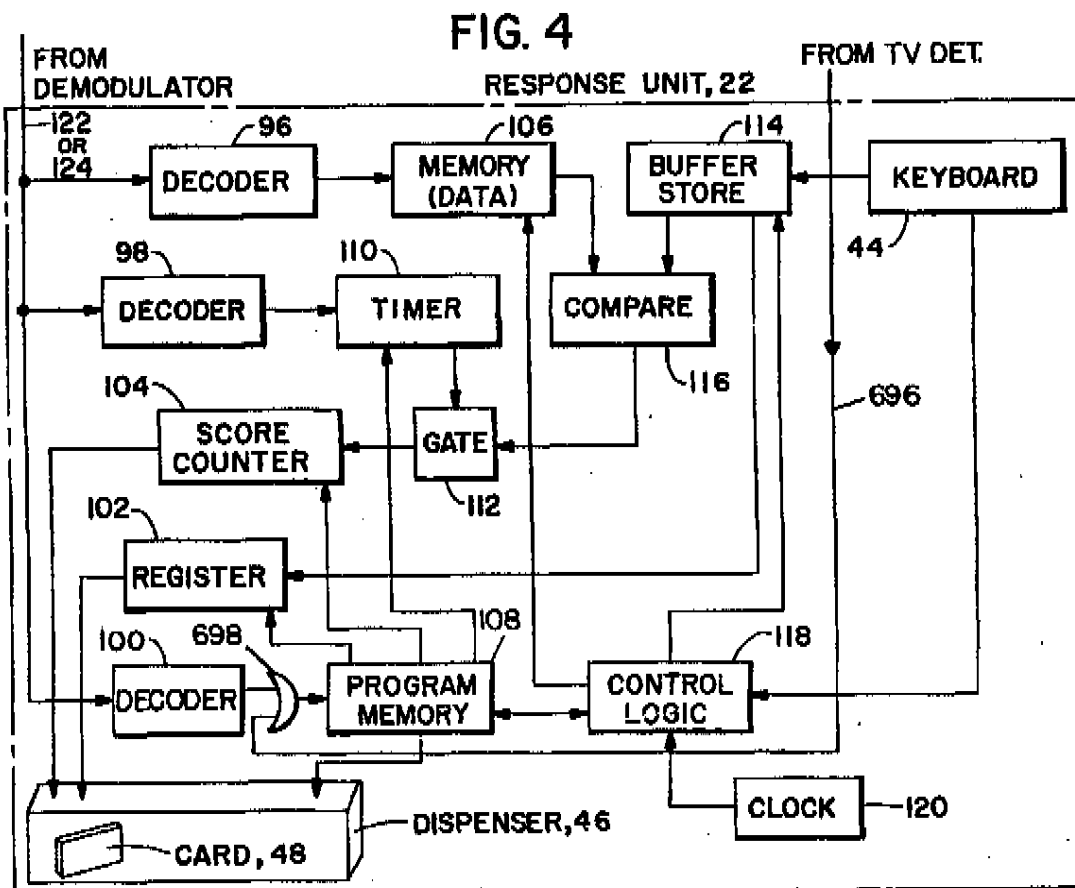
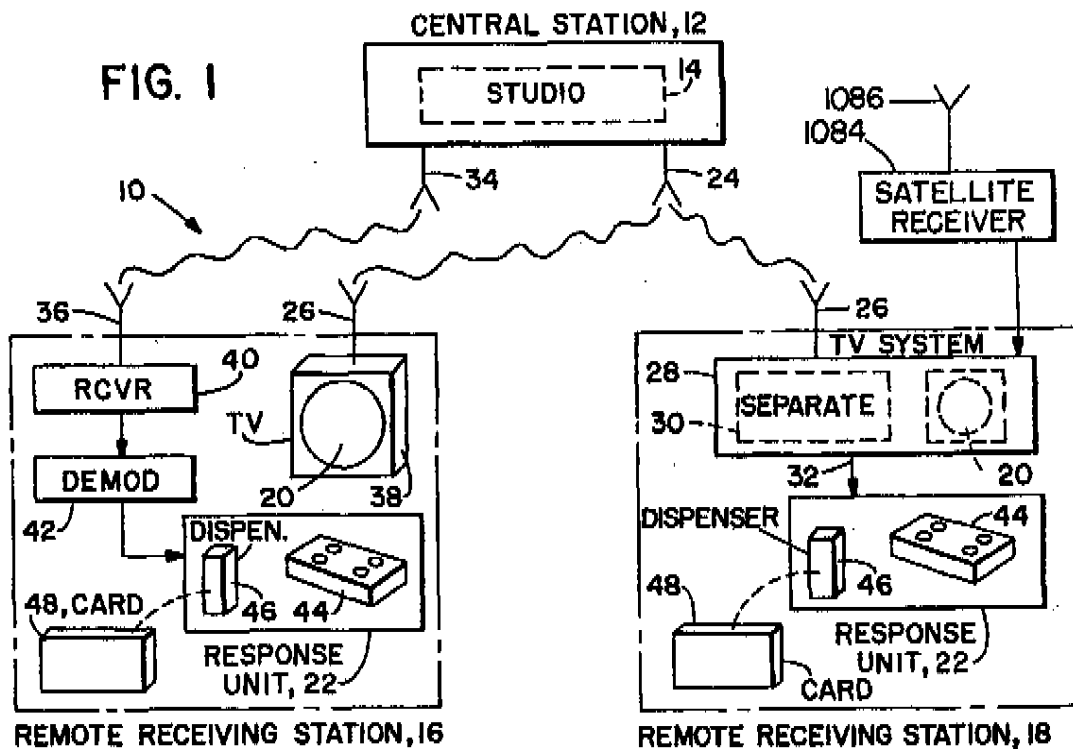
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FIG. 2

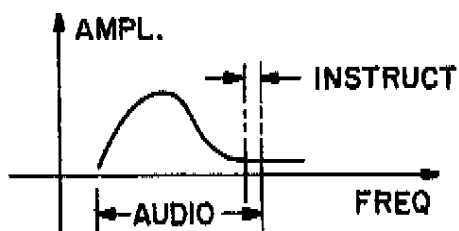
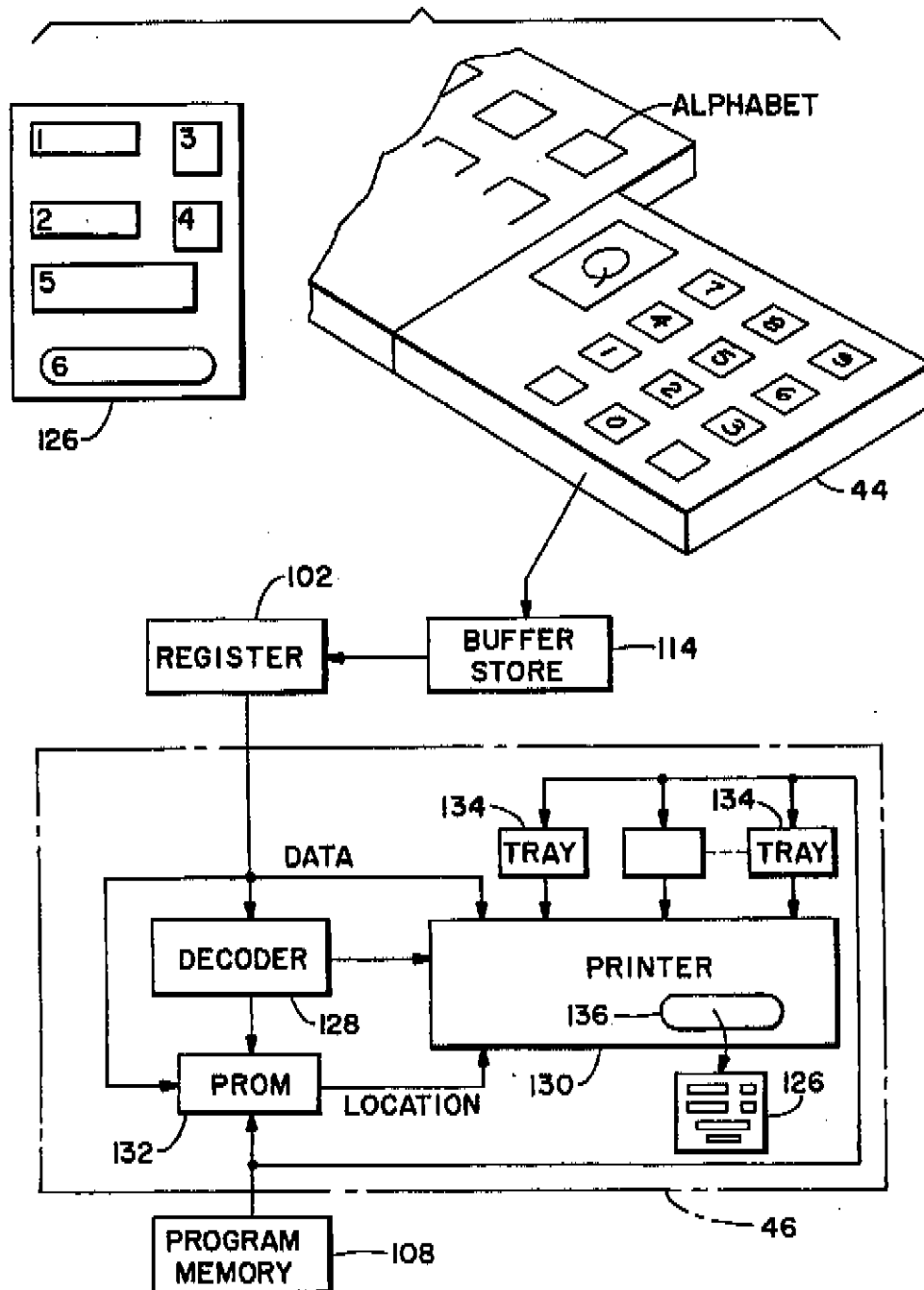


FIG. 5



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FIG. 3

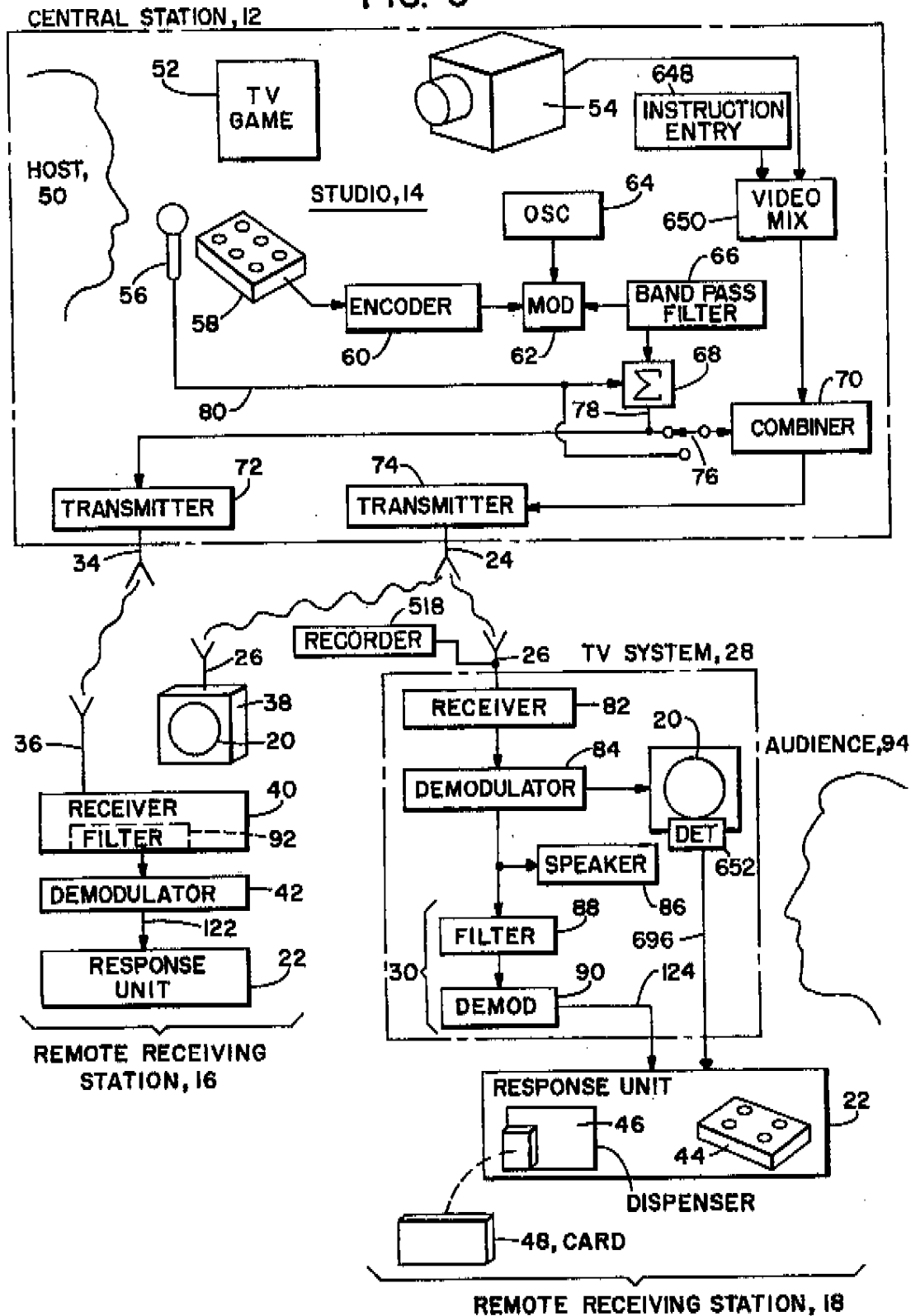
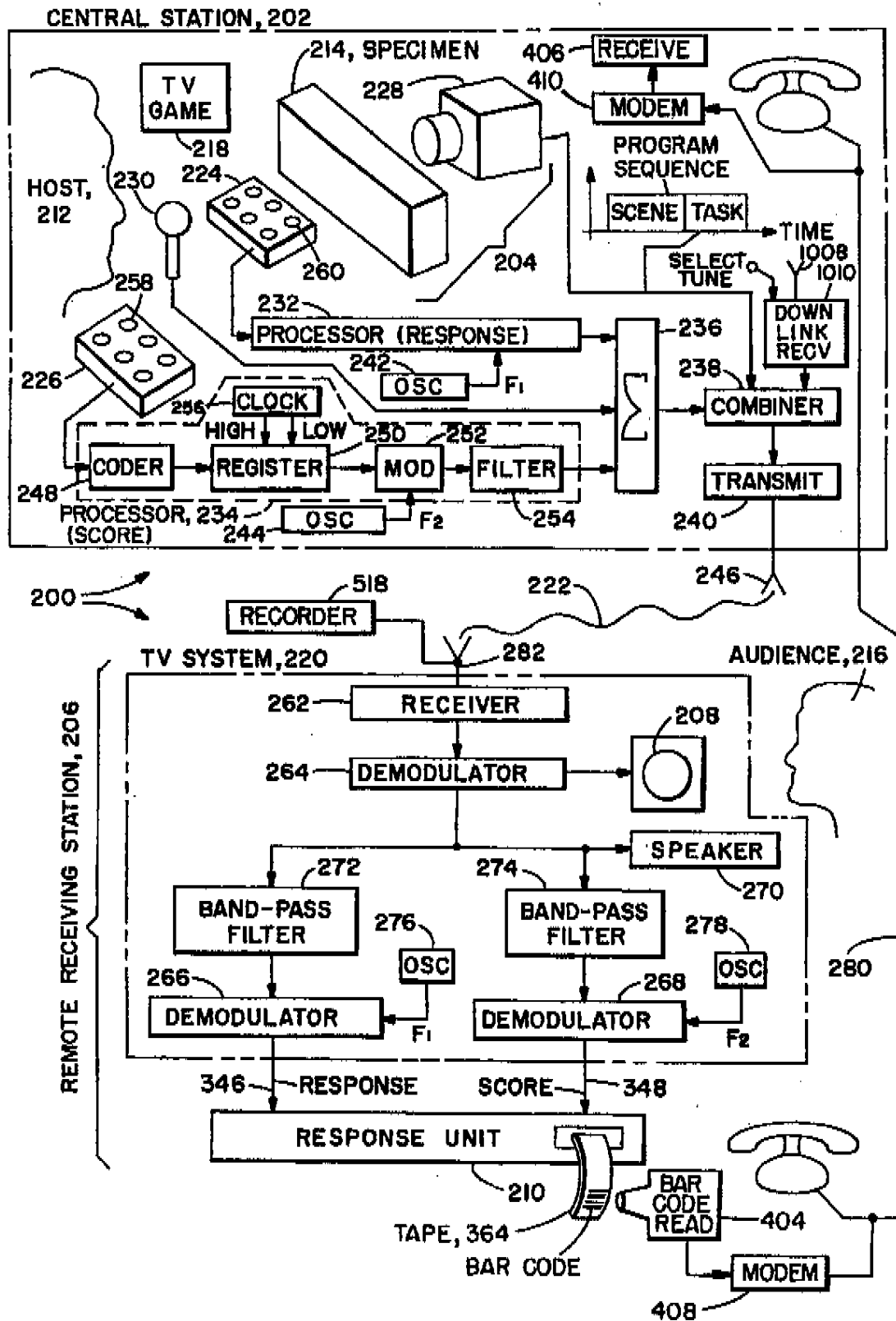


FIG. 6



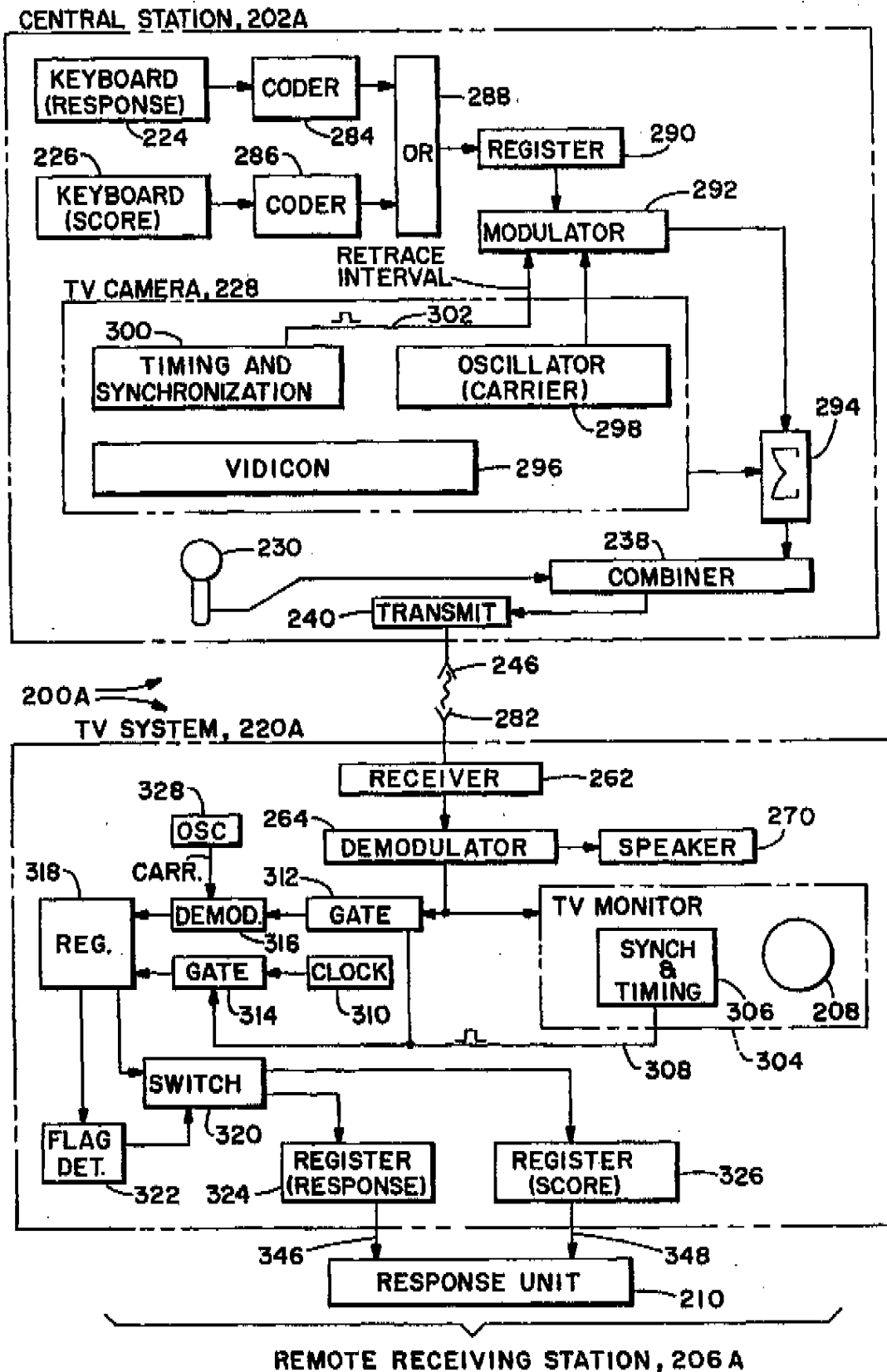
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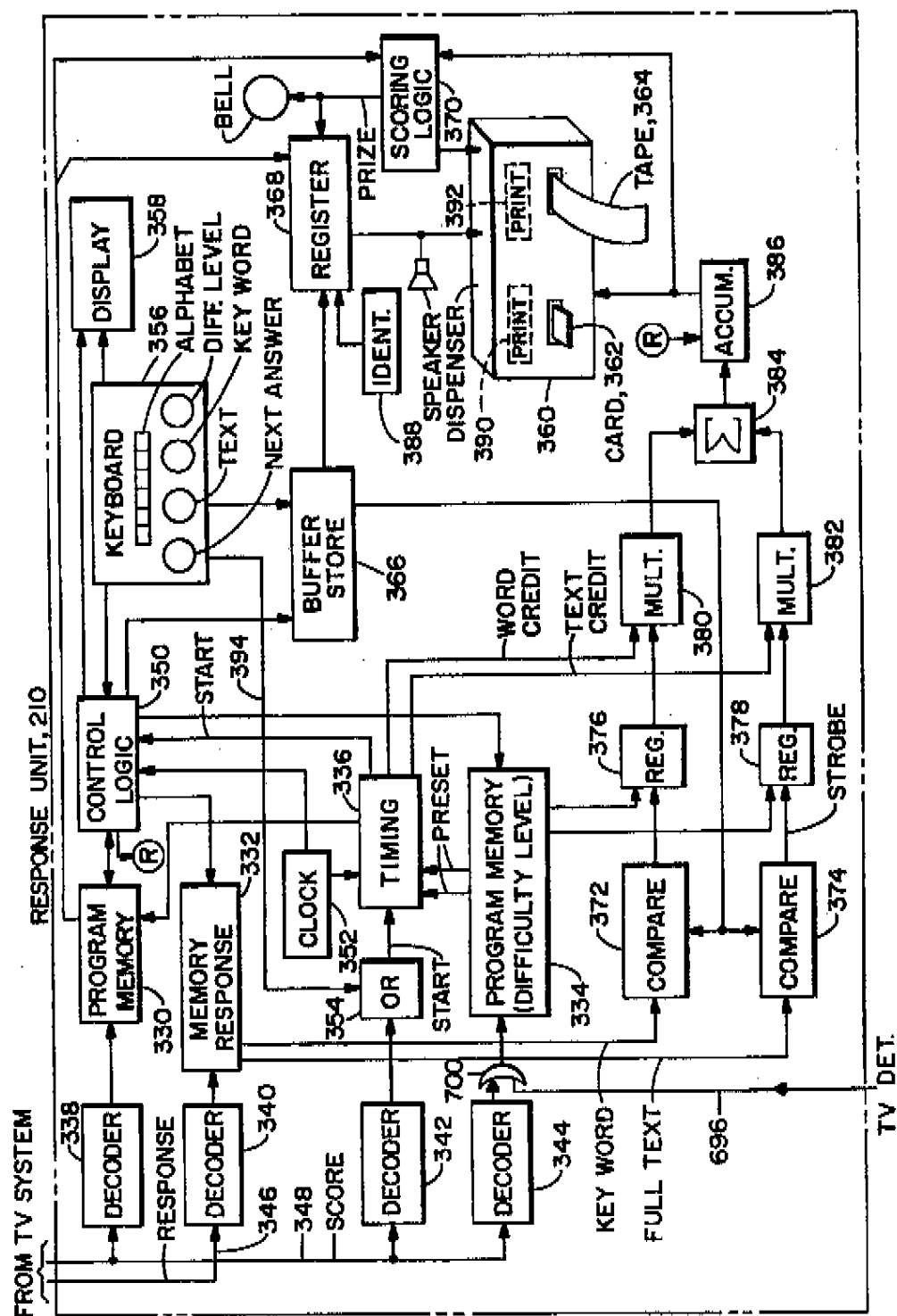
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FIG. 7



**FIG. 8**



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FIG. 9

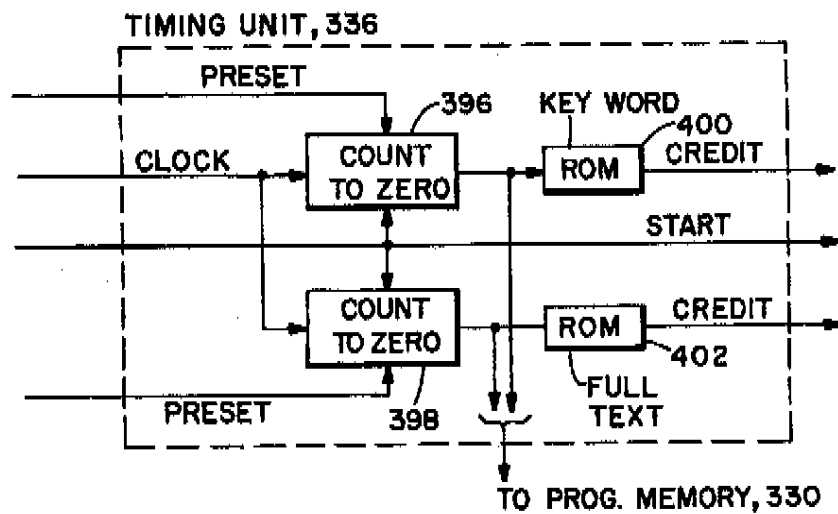


FIG. 10

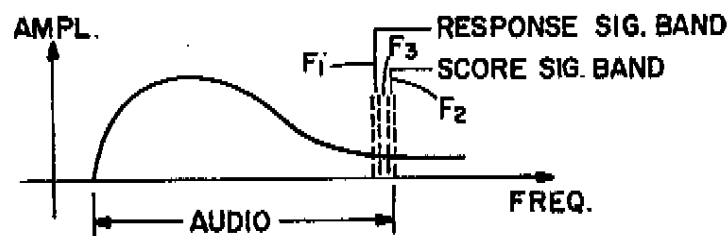


FIG. 19

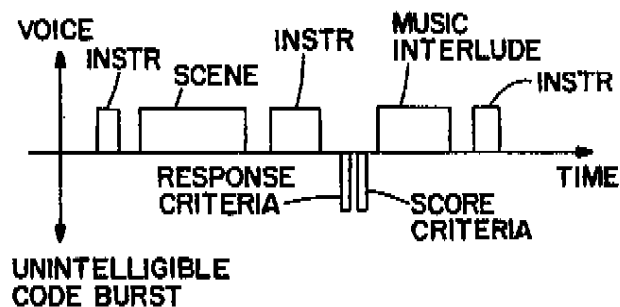
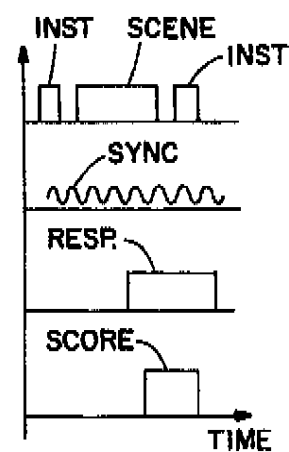


FIG. 20





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FIG. 11

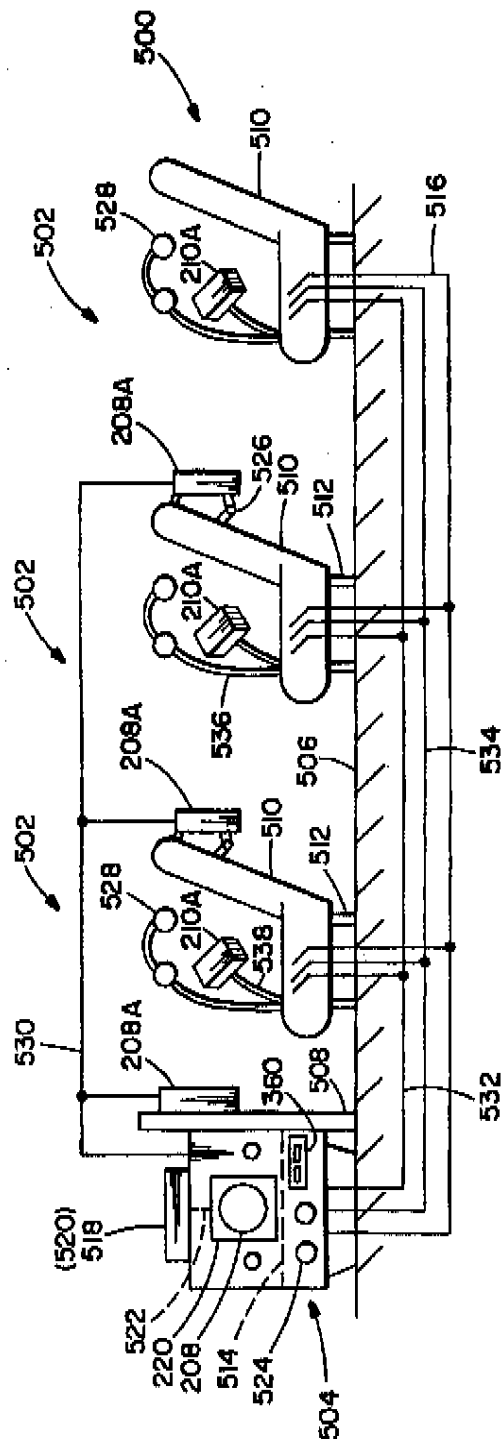
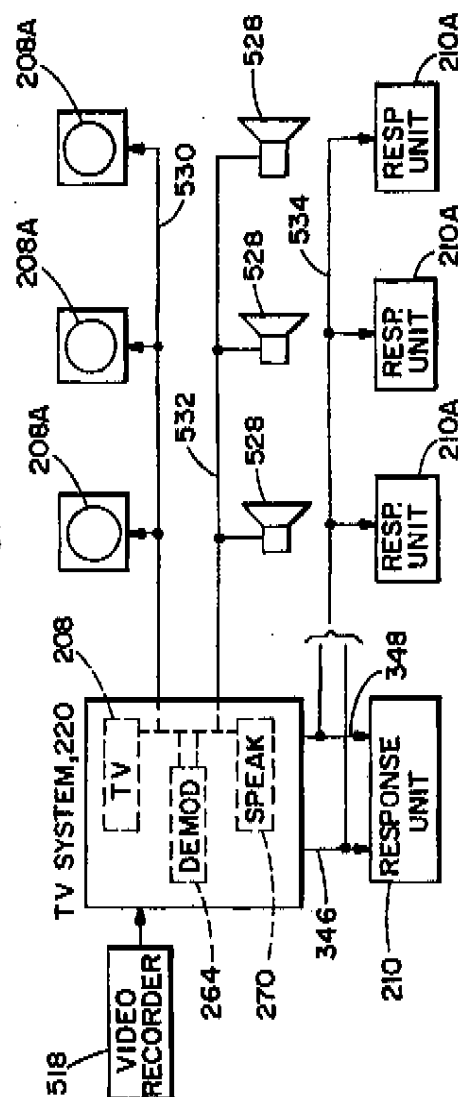
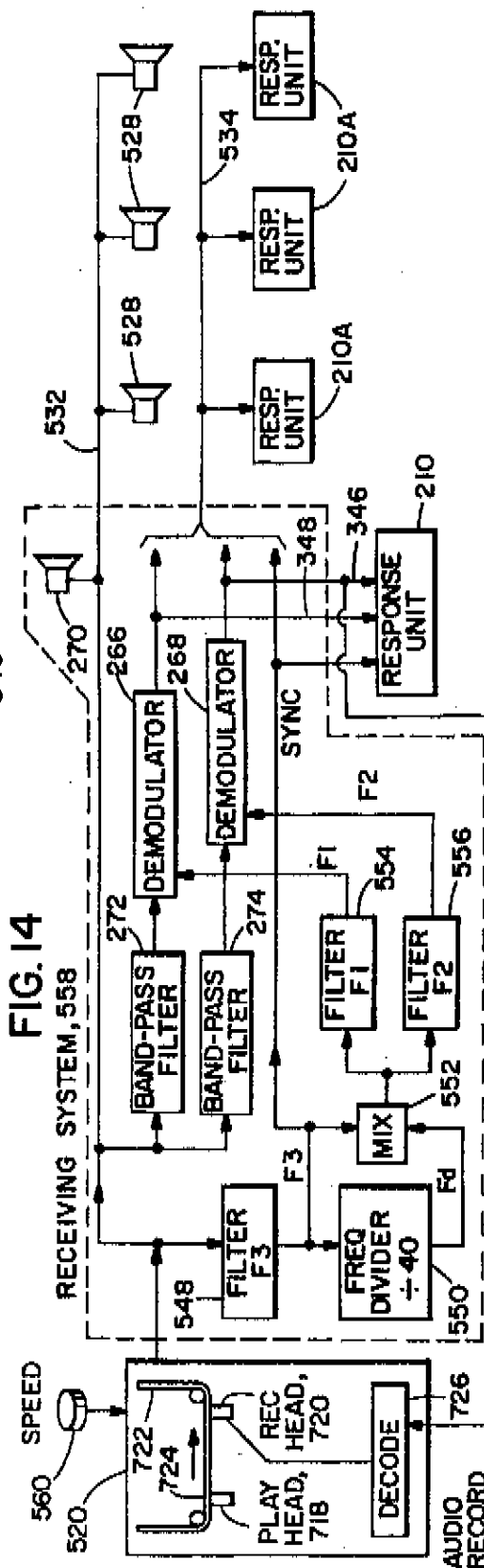
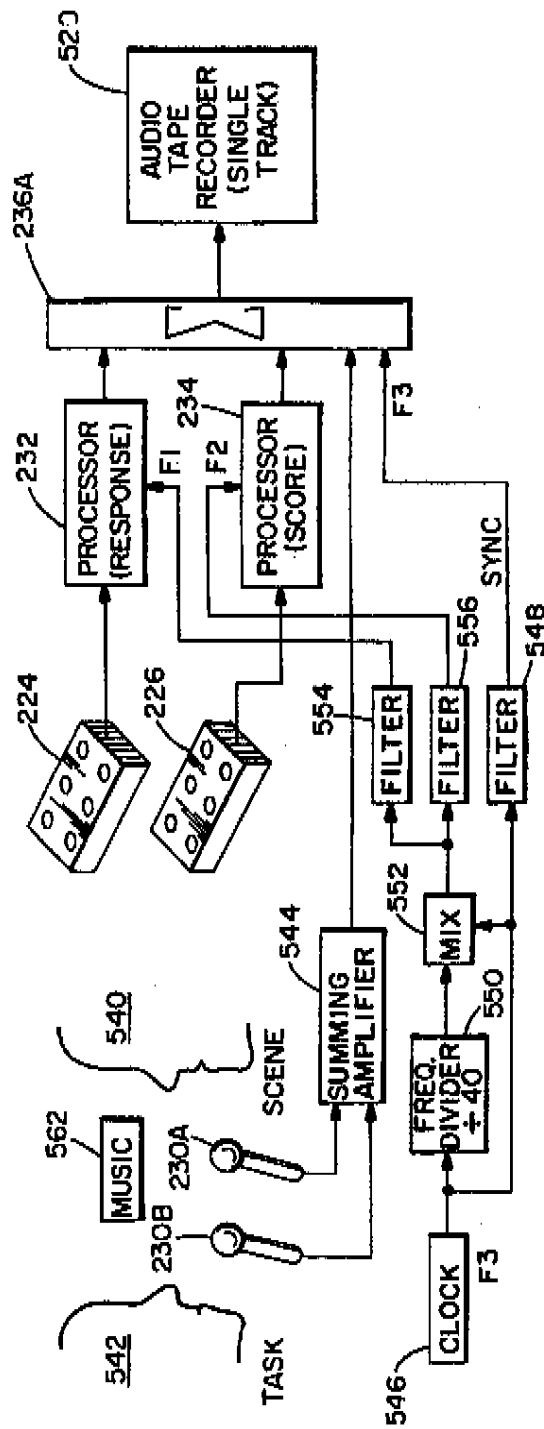


FIG. 12





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FIG. 15

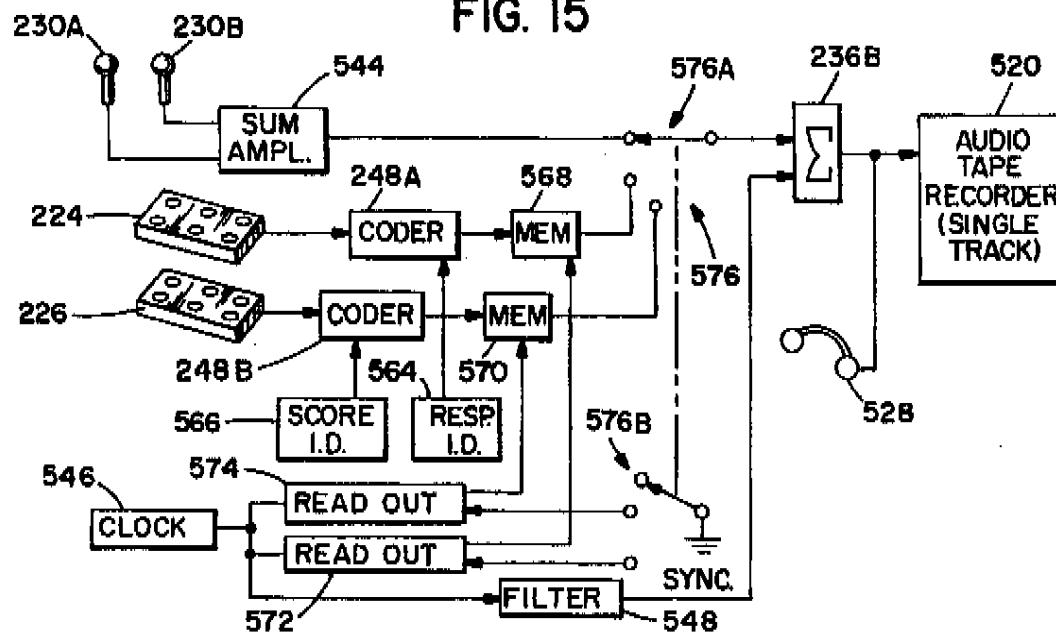


FIG. 16

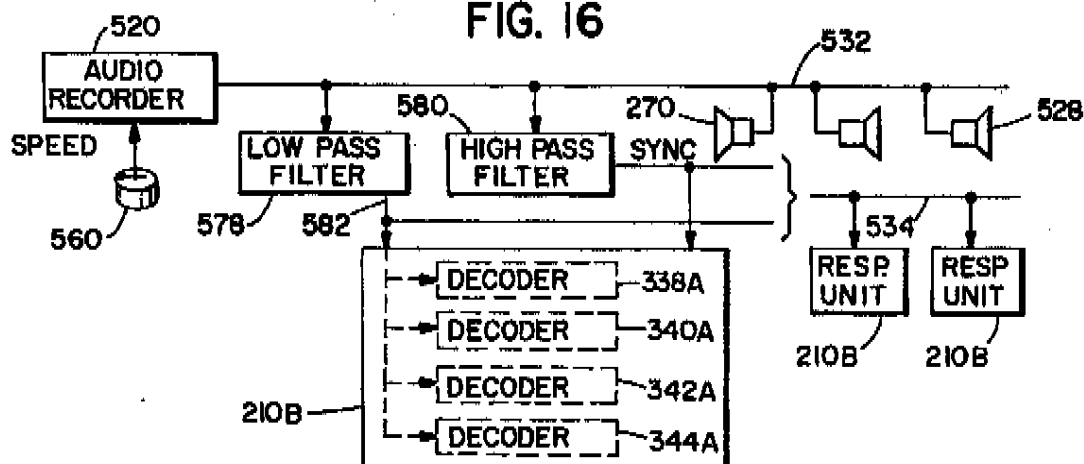
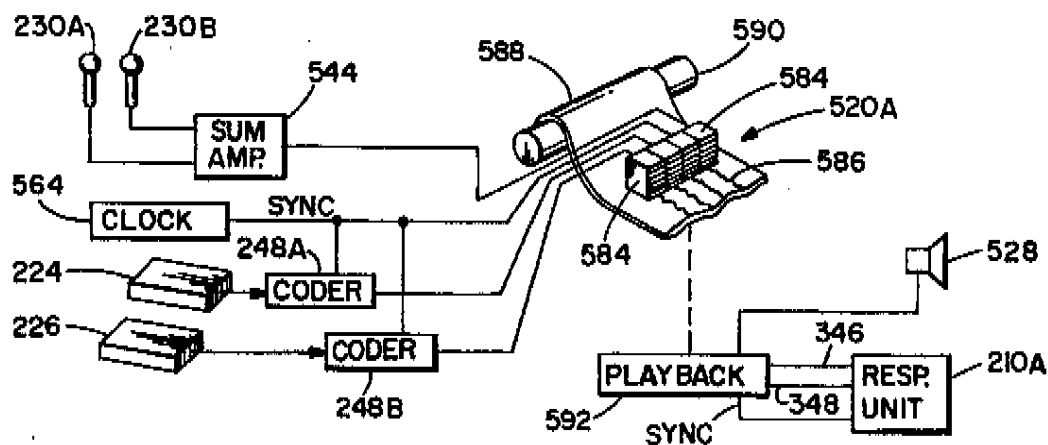


FIG. 17



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FIG. 18

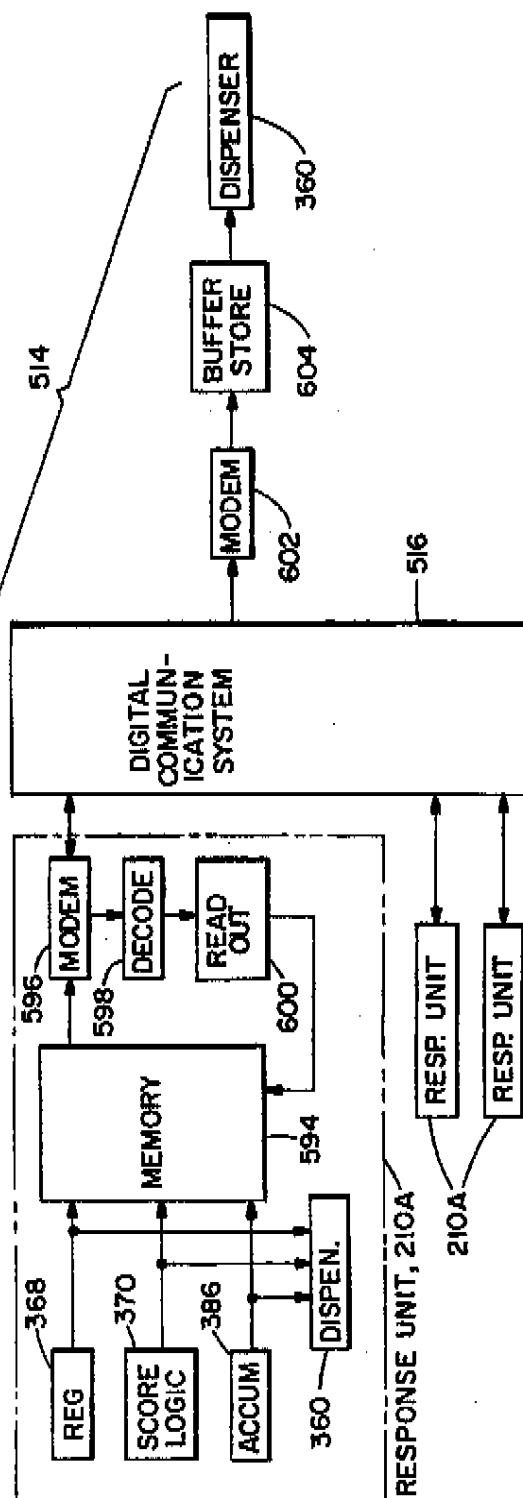
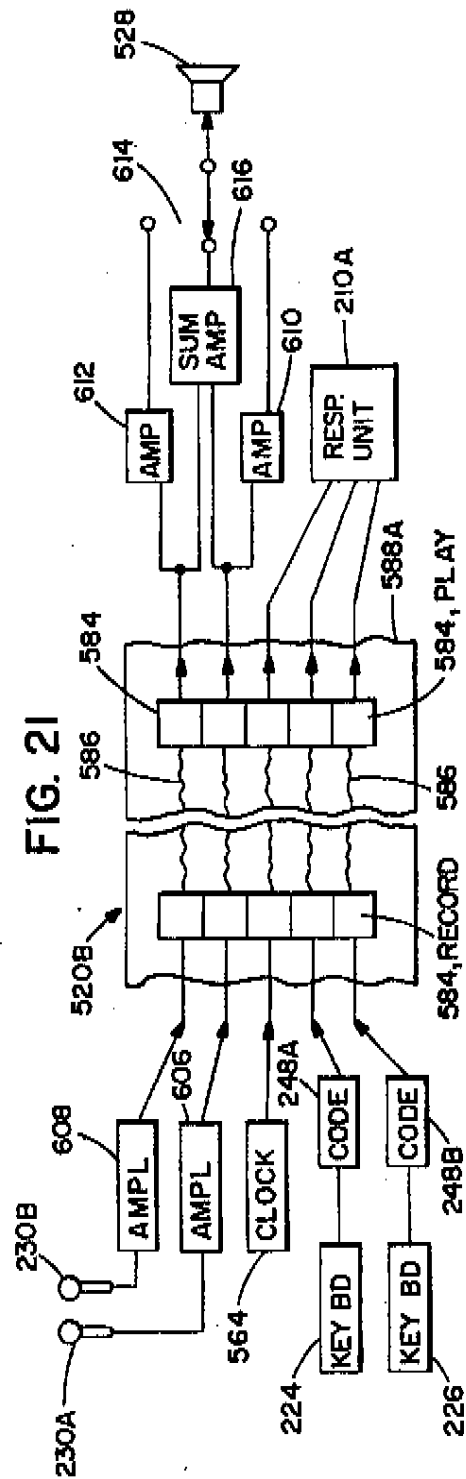


FIG. 21



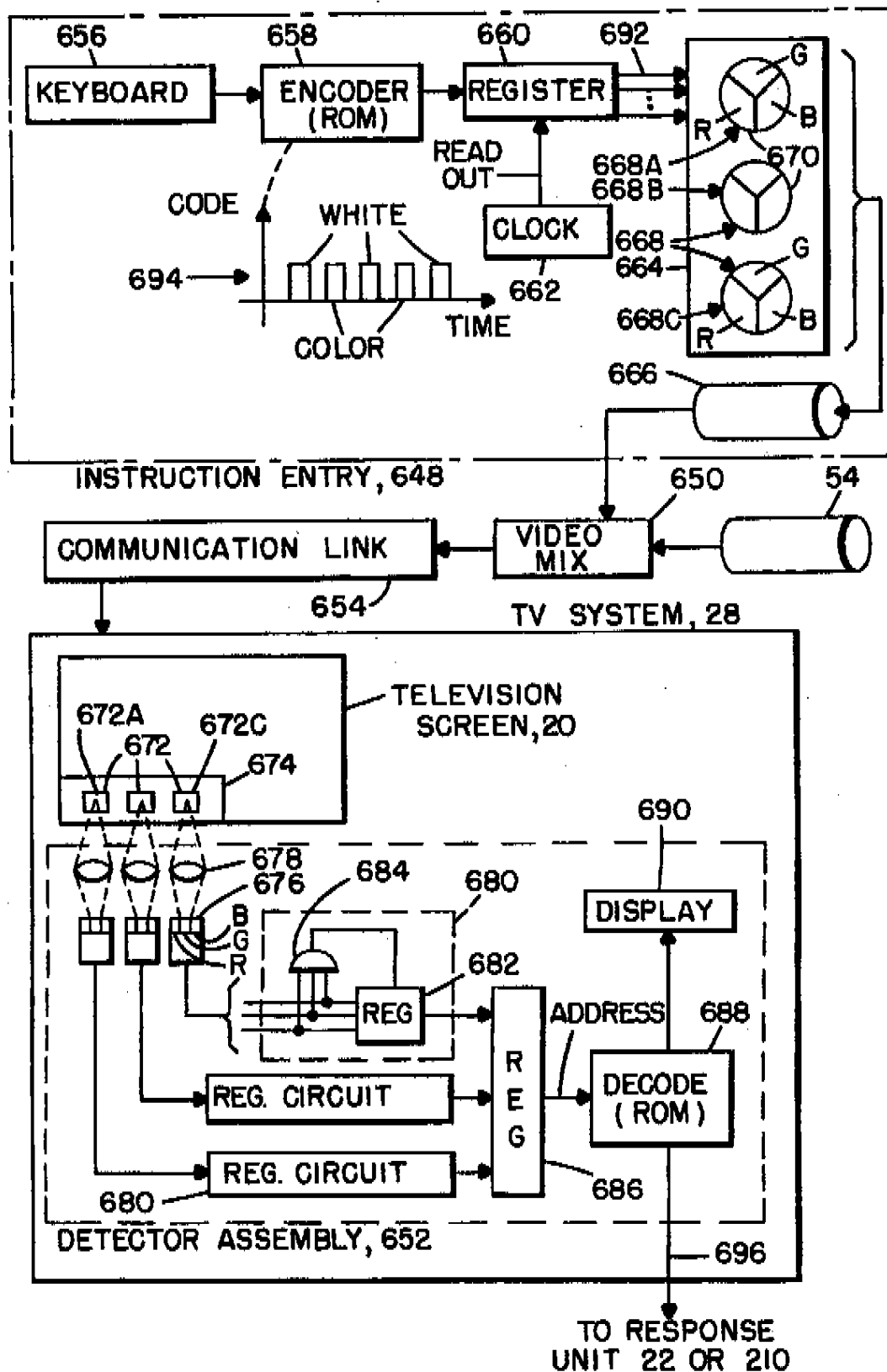


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**FIG. 23.**

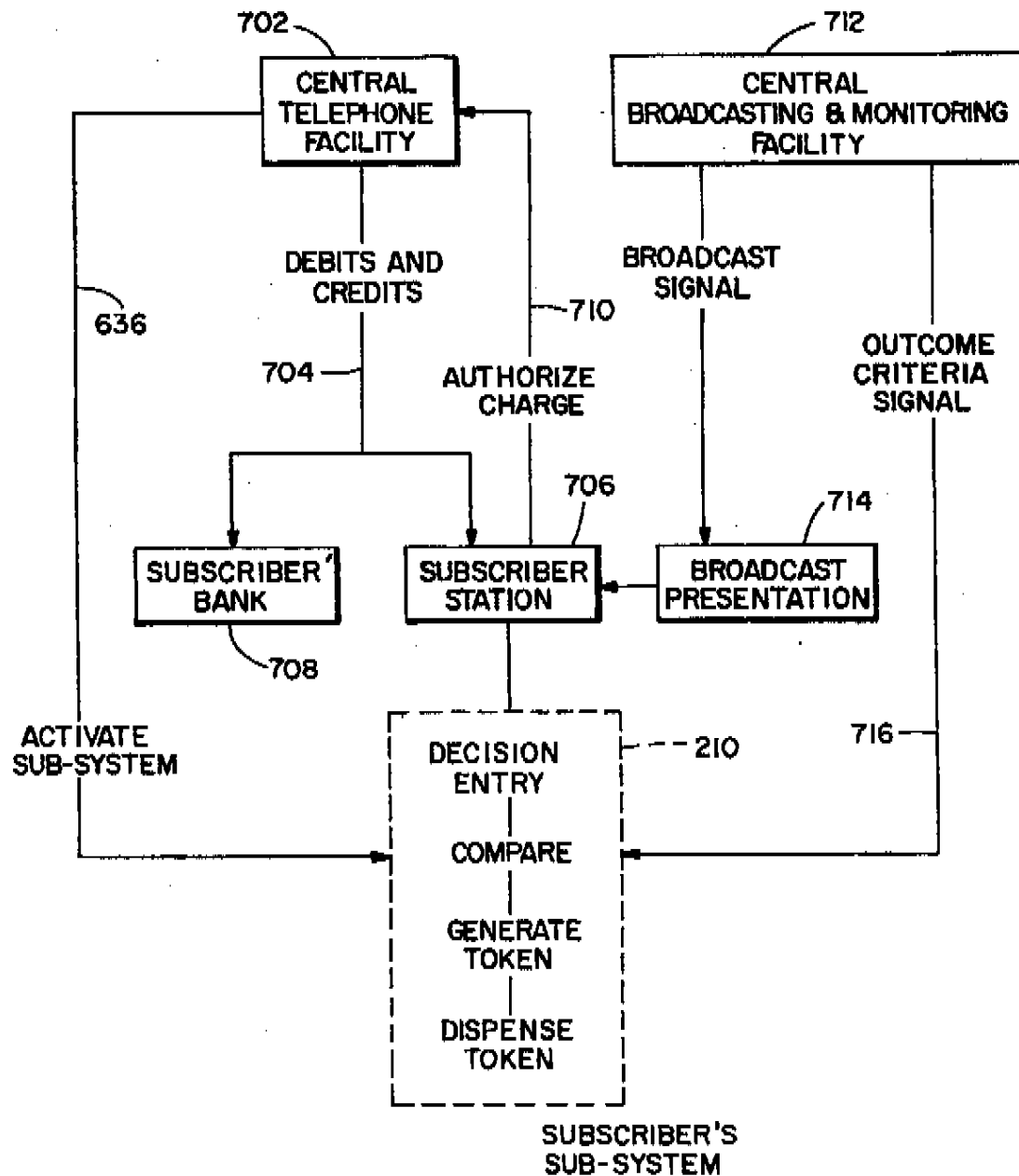
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FIG. 24



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FIG. 25

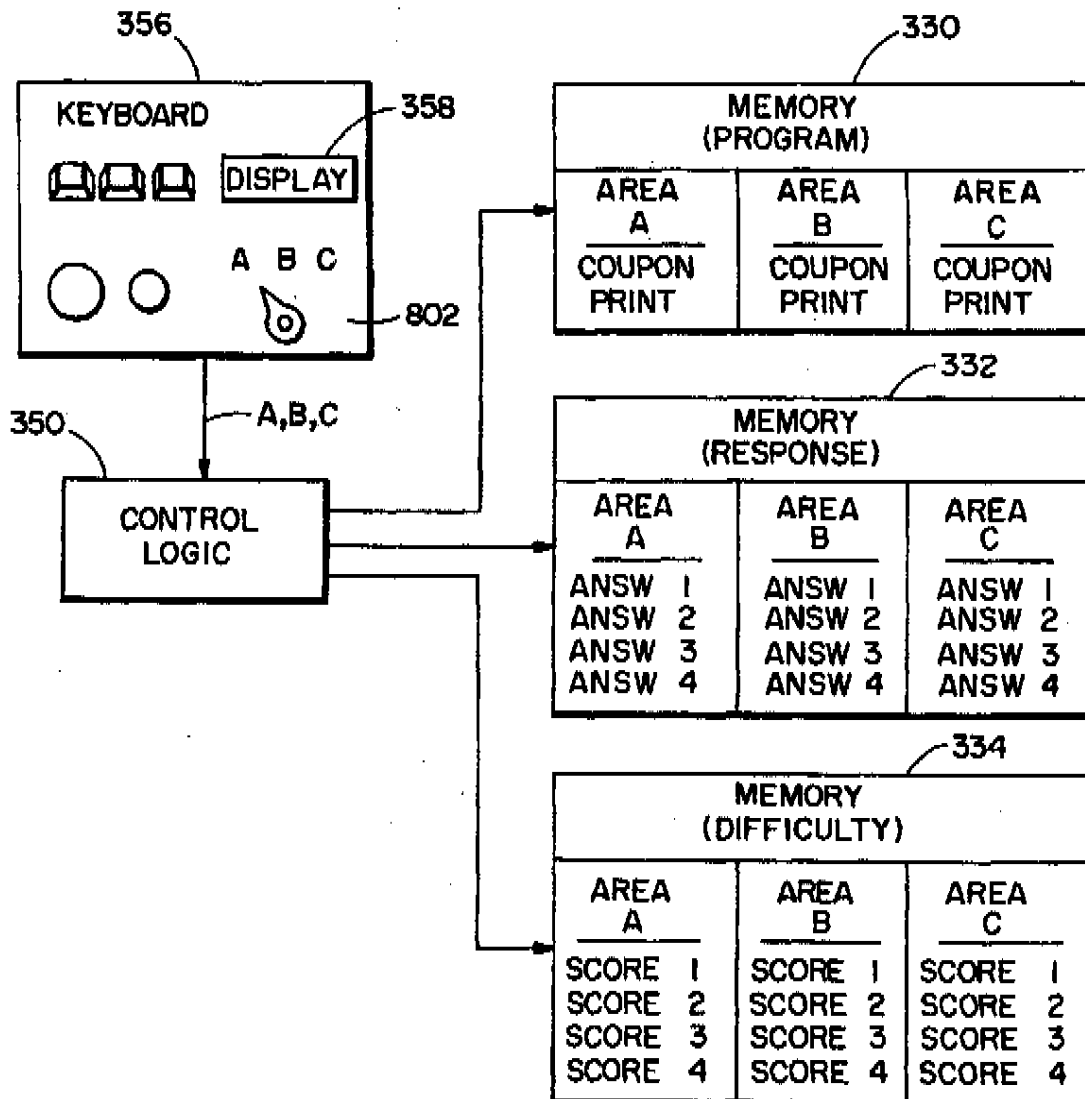
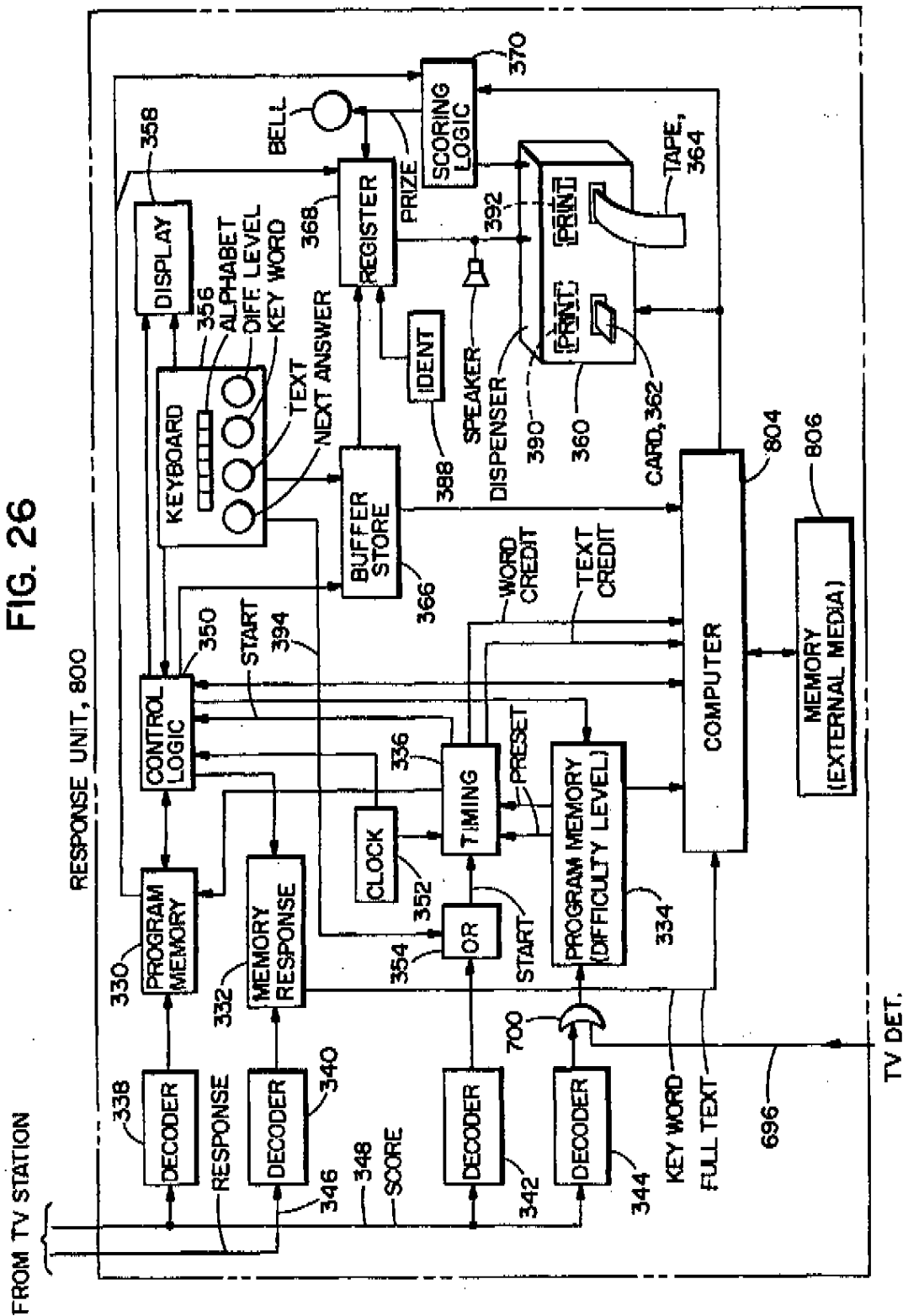




FIG. 26



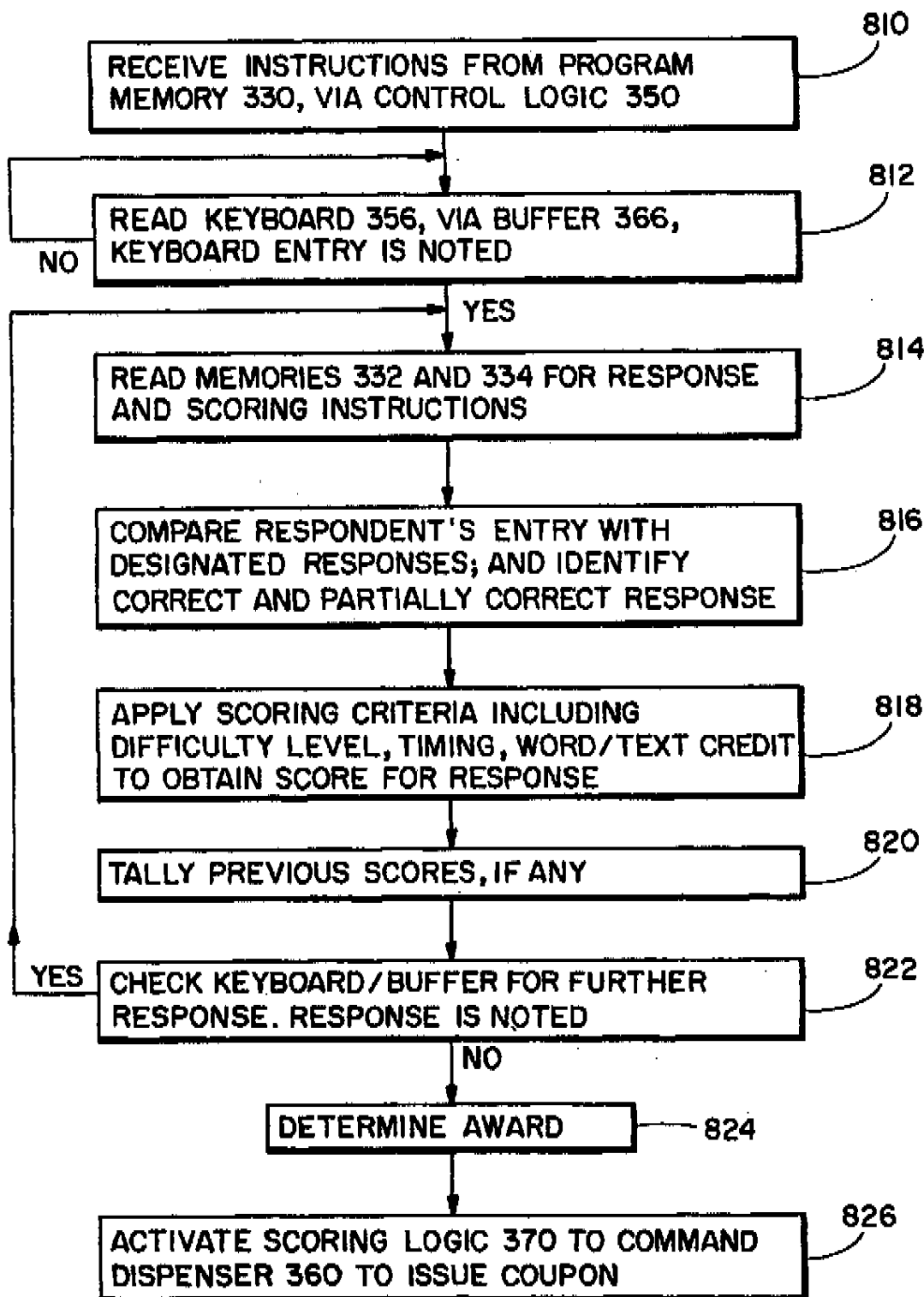
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FIG. 27



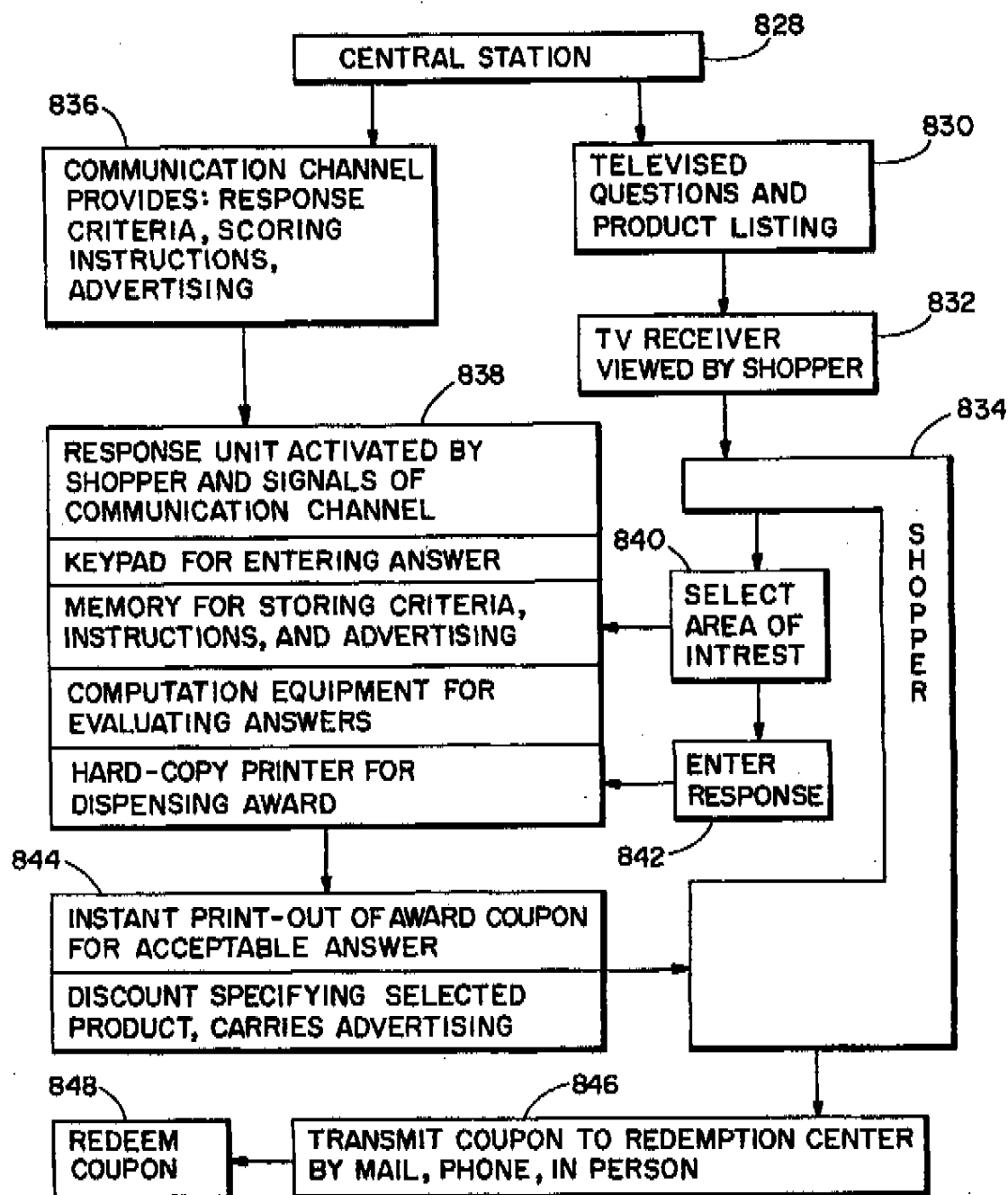
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FIG. 28



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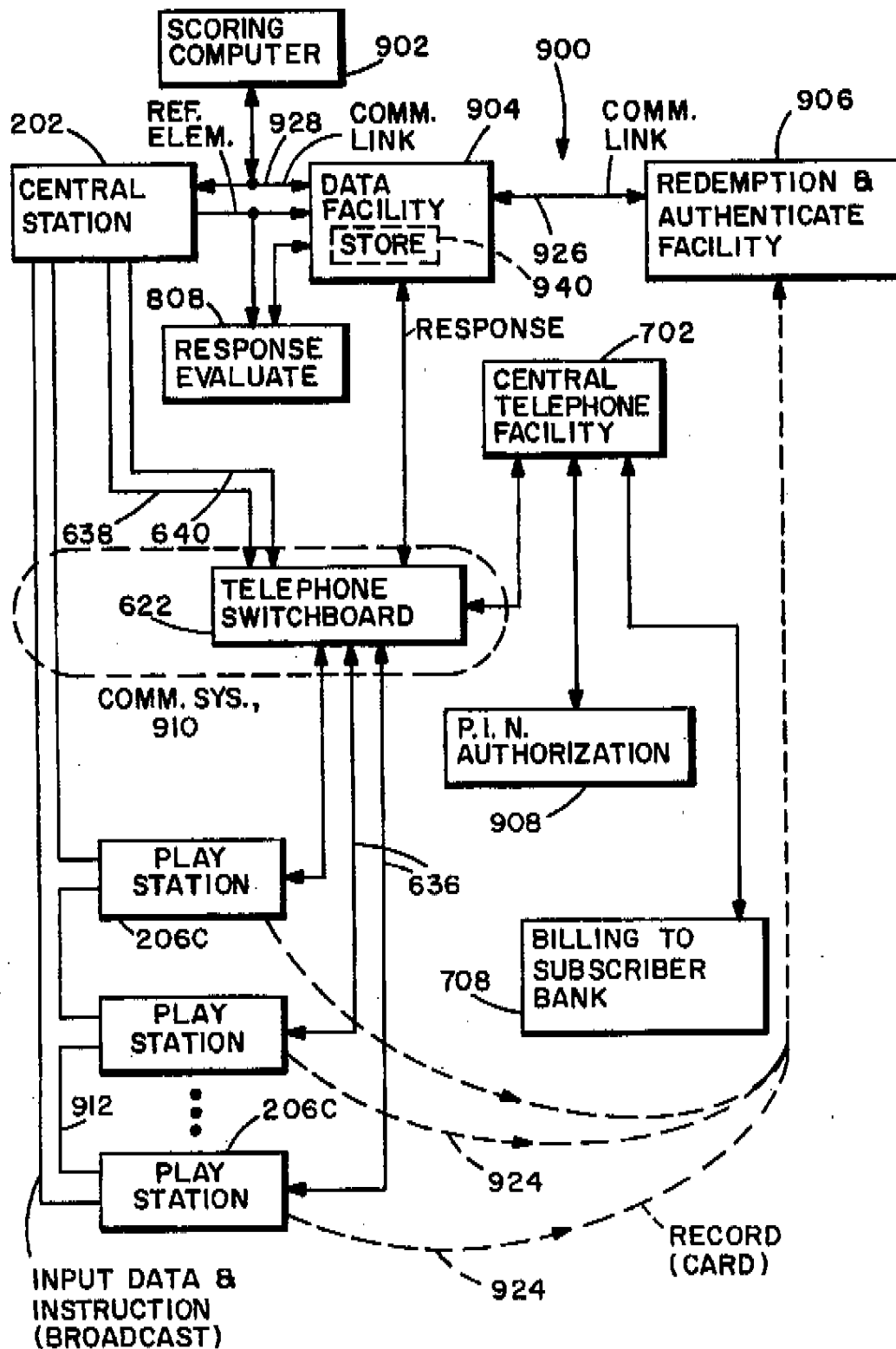
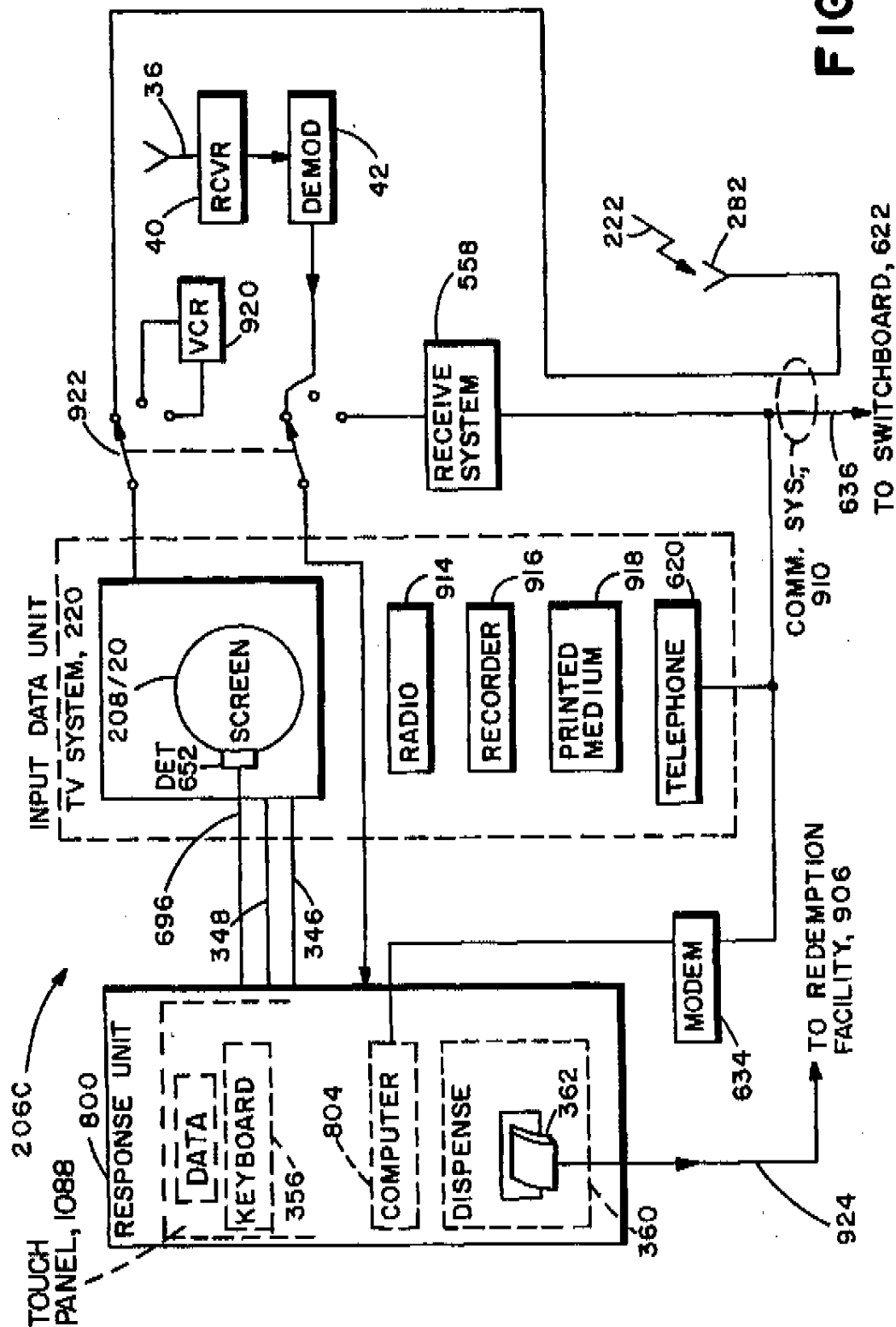


FIG. 29

**FIG. 30**



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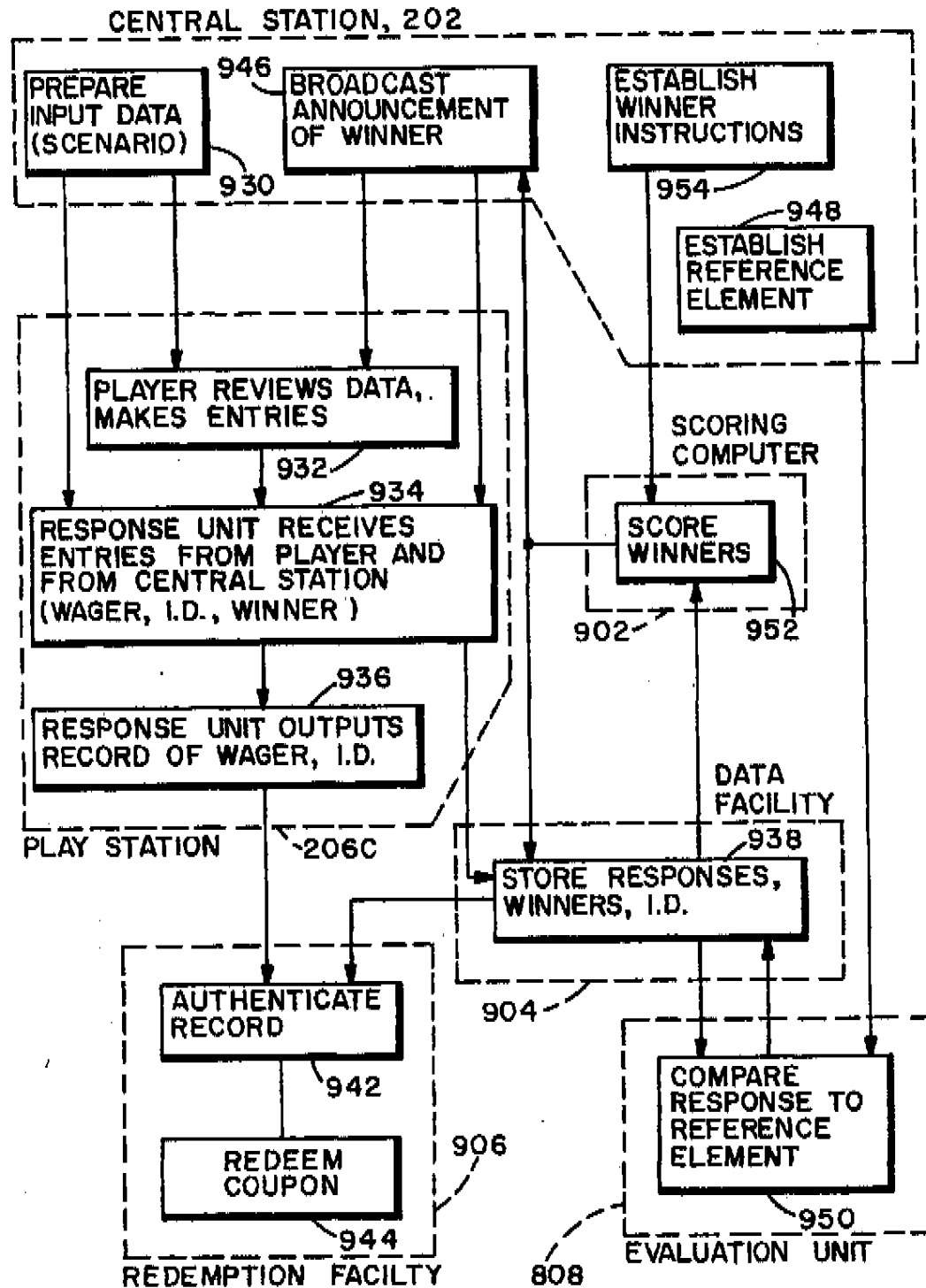


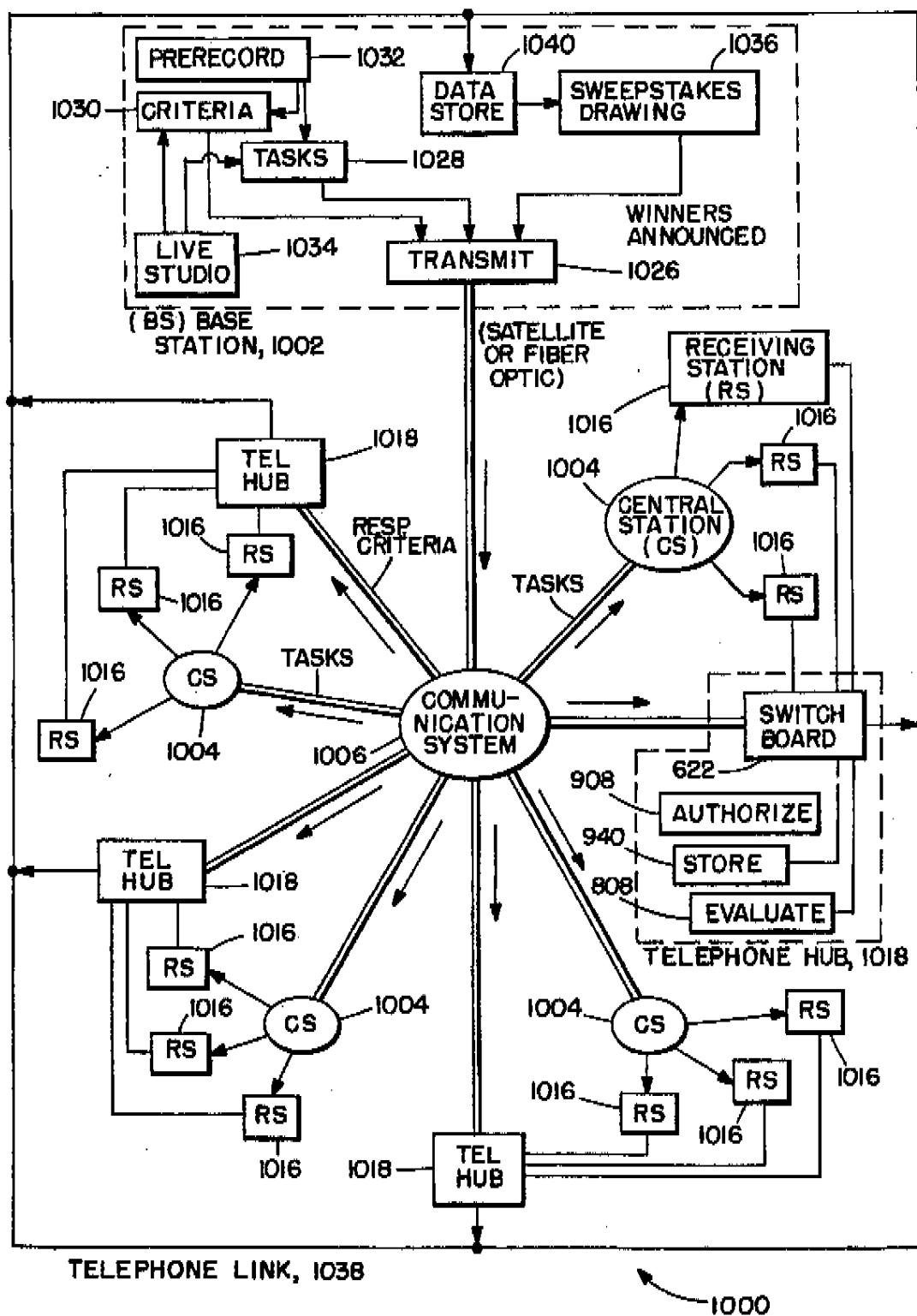
FIG. 31

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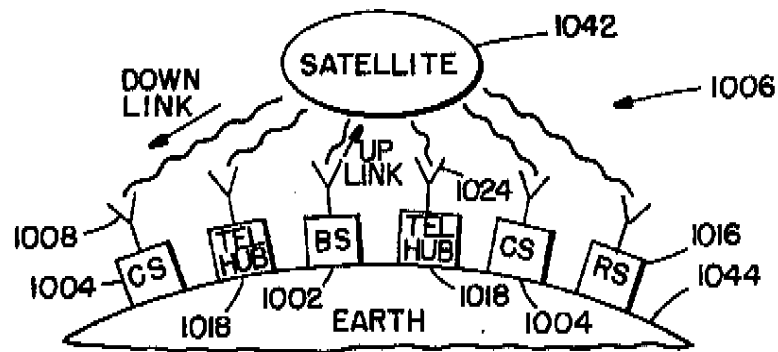
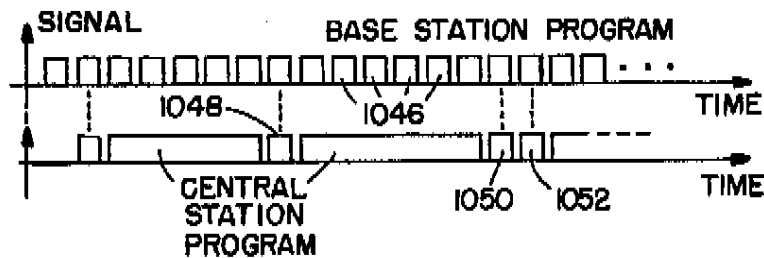
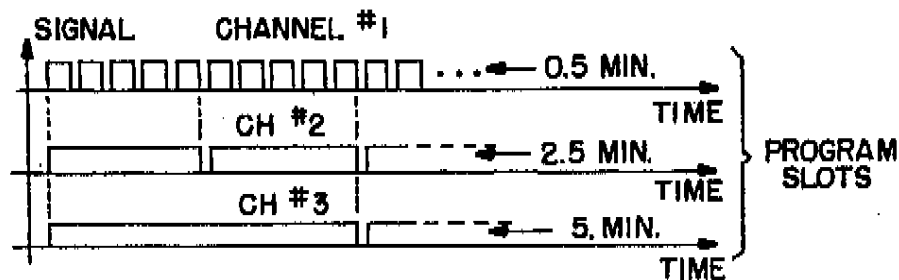
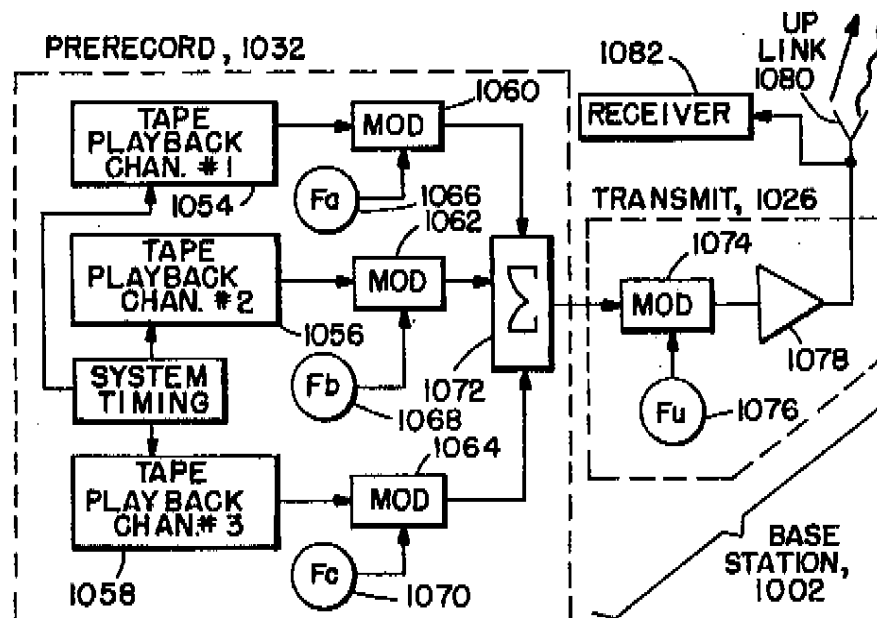
**FIG. 32.**

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**FIG. 33.****FIG. 34.****FIG. 35.****FIG. 36.**

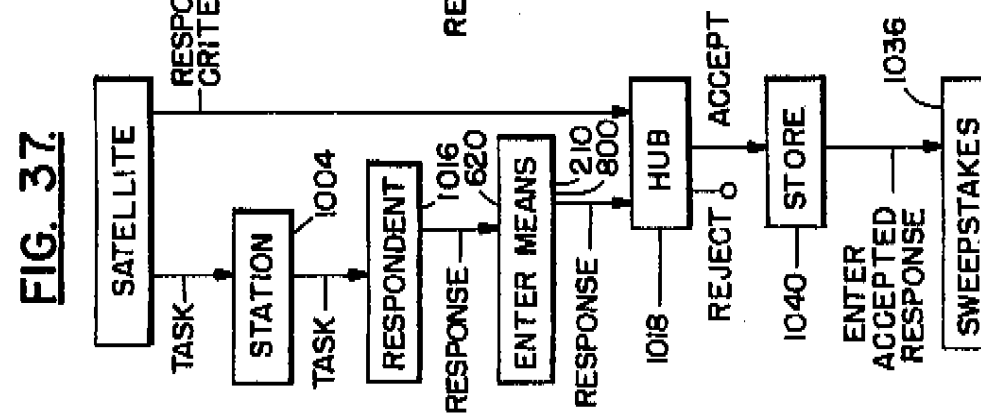
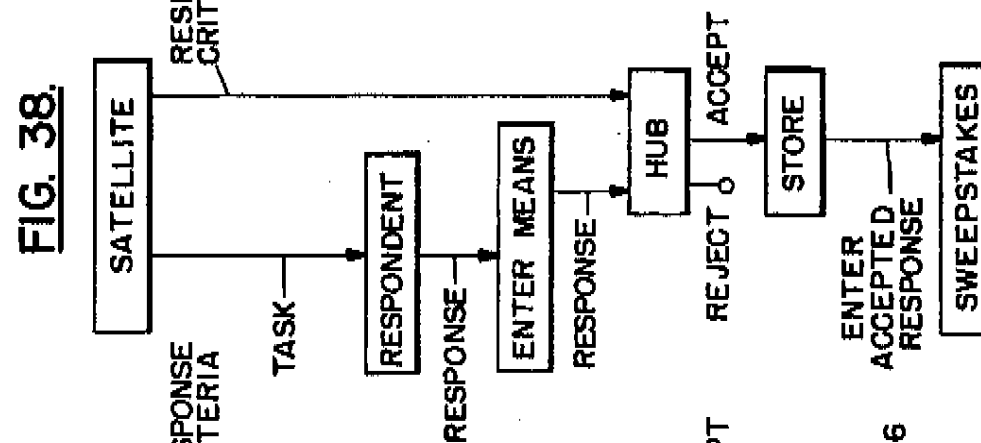
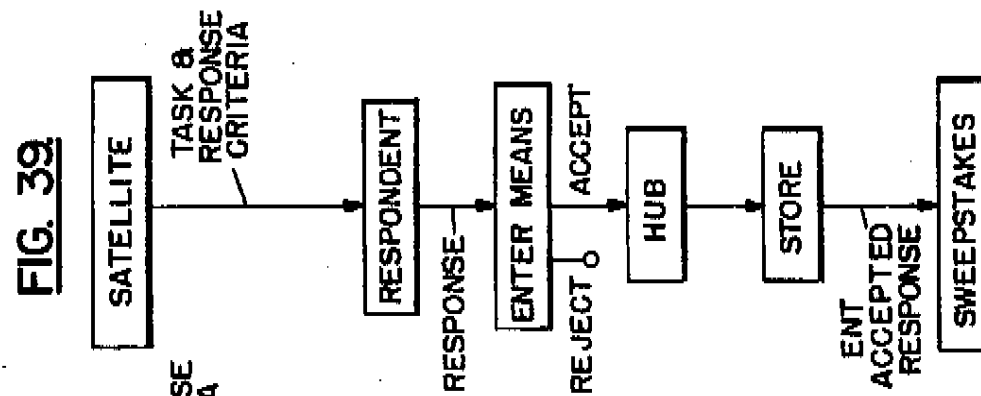
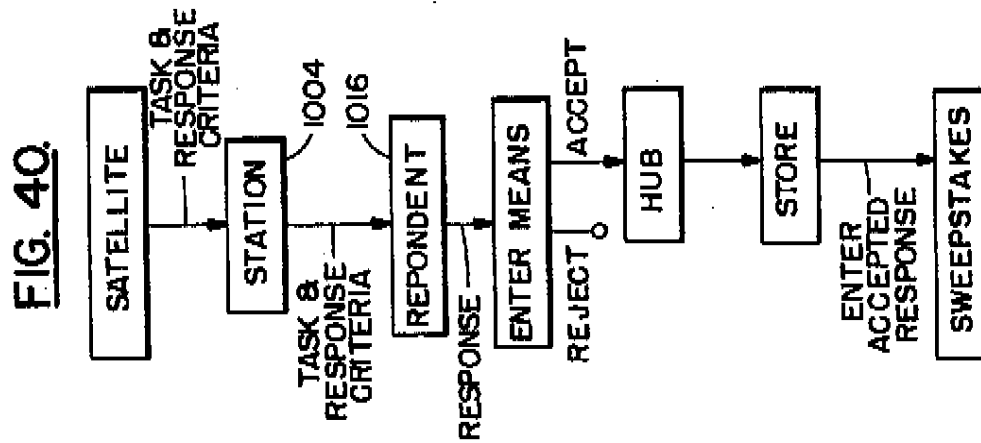


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## GENERATION OF ENLARGED PARTICIPATORY BROADCAST AUDIENCE

This application is a continuation-in-part of application Ser. No. 07/763,672 filed Sep. 19, 1991, now U.S. Pat. No. 5,283,734 which is a continuation in part of application Ser. No. 07/603,882 filed Oct. 25, 1990, now U.S. Pat. No. 5,057,915, which is a continuation-in-part of application Ser. No. 07/424,089 filed Oct. 19, 1989, now U.S. Pat. No. 5,034,807, which is a continuation-in-part of application Ser. No. 192,355, filed May 10, 1988, now U.S. Pat. No. 4,926,255, which is continuation-in-part of application Ser. No. 837,827 filed Mar. 10, 1986, now U.S. Pat. No. 4,745,468. Related material is found in U.S. Pat. No. 4,876,592 which is also a continuation-in-part of said application Ser. No. 837,827.

## BACKGROUND OF THE INVENTION

This invention relates to transmission by electronic media including radio and television broadcasting programs, as well as recordings of such programs, to listeners and viewers of the programs and, more particularly, to the provision of signals designating questions or tasks including a wagering situation, to the provision of response criteria for evaluating responses of the listeners and viewers of the broadcast or prerecorded programs, and to the dispensing of awards to individual listeners and viewers having provided answers meeting the response criteria and/or placed a wager.

The invention also particularly relates to the transmission of signals conveying scenarios of events about to take place or taking place and to outcome criteria for evaluating predictions of listeners and viewers of the broadcasts of such events and to the dispensing of awards to individual listeners and viewers having provided predictions meeting the outcome criteria. An example of a situation involving a prediction is a wagering situation in which a player designates a wager applied to a possible outcome of a given scenario.

A common form of program transmitted by the broadcast media is the quiz program. Typically, in such a program, a panel of people provide answers to questions arising from the subject matter of the quiz. Often, the answers are indicated by use of a keyboard with electronic circuitry. The answers may be provided in response to questions which are asked directly, or in response to a situation such as a chess game, or task presented by the program such as in the solving of a puzzle. Other situations such as in sports, call for predictions of outcomes of events.

A characteristic of such quiz programs is the fact that the responses to the questions are limited to participants in the studio audience. The much larger external audience, namely the listeners of radio and viewers of television, are generally excluded from participation except for those few people who, on occasion, may have the opportunity to call in a response via telephone to a situation arising in the program. Letter writing has also been employed as a means of response to questions and other matters raised by the program.

Thus, it is apparent that a problem exists in that a large percentage of the external audience is essentially excluded from active participation in the broadcast programs. In view of the fact that the studio audiences can provide their responses electronically, it is clear that personal involvement, such as conversation among participants, is not necessarily required. It is, therefore, apparent that such programs should be open to participation by the larger external

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audience in addition to the studio audience; yet, no system providing for such participation has been available.

It is noted that this problem is not limited to quiz programs only, but that other forms of programs in the areas of education and research might also be conducted in a fashion allowing active public participation if a suitable system were available to make such public participation possible. A desirable feature of such a system would be the capability for evaluating and recording the responses, a feature that would be very useful in the case of educational programs because such a feature would permit a teacher to grade or otherwise evaluate papers and examinations dispensed to students by the broadcast media. Such a system would also be useful in commercial ventures wherein a prize is to be given to a participant providing an acceptable answer. In such a case, the participant would bring the recorded answer, which might be in the form of a coded credit card, to a store or other establishment for receipt of the prize. This would be a great convenience in the implementation of a sales and advertising program. Responses by the listening or viewing audience can also be used in conducting a survey of public opinion. However, in spite of the advantages which would be provided by such a system, for including the listening and viewing audience, no practical system has yet been available.

It would be advantageous also if the equipment of the system could be employed in the conduct of wagering, whether a simple lottery or a more complex situation involving wagering based on responses to a quiz game, educational game or a situation relating to the advertising of a product. It would be advantageous furthermore if such wagering could be conducted electronically so as to inhibit forgery and to reduce the number of inconvenient trips which a bettor must make to a lottery agent. Such a system and method of wagering is not available at the present time.

## SUMMARY OF THE INVENTION

The foregoing problem is overcome, and other advantages are provided by a system for the evaluation of responses to a broadcast or a prerecorded program wherein a response may include the entry of a wager on a possible outcome of a situation presented in the program. In accordance with the invention, the system provides for the transmission of signals designating conditions of the wagering and, in the case of scenarios, games or other events upon which a person may wish to bet, the system provides questions and response criteria along with a transmission of the broadcast program. In the event of questions or similar tasks, signals may be recorded prior to transmission, and may be transmitted at a fixed predetermined time, or upon request of a person who will respond to the program and/or questions. The invention includes both method and system aspects which create added interest and excitement among listeners and viewers, and thus tend to increase the audience of stations carrying programs of the type to be described hereinafter.

In accordance with the theory of the invention, two groups of signals are broadcast, wherein each of the two signal groups may be divided in two portions designated as first and second signals. In the first signal group, the first of the two signals includes the program signal itself which may be broadcast from a radio station or television station to the listening or viewing audience. The second signal of the first group is a signal transmission setting forth a task, such as the answering of one or more questions which may be viewed on a television screen and/or listened to over radio or the

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audio portion of the television transmission. For simplicity in describing the invention, an audience viewing a televised program is presumed. It is understood that the description of the invention in terms of the viewing audience applies also to the listening audience of a radio broadcast.

The second of the two signal groups is in the nature of an instructional signal group identifying the amount of time available for an answer, the proper content and form of an acceptable answer, and a mode of scoring the answers. In one embodiment of the invention, the first signal of the second signal group sets forth the desired acceptable answer or answers, and the second signal provides the mode of scoring responses, such as the parameters, formulas and other response criteria to be employed in the scoring of the answers. Therefore, in this one embodiment of the invention, the two signal groups include at least four sets of signals which are transmitted, each of which can be varied independently of the other, and which may be transmitted concurrently or at different times.

Included at the site of each viewer in the external or remote audience is a television set, plus electronic response equipment having circuitry for reception of the instructional signal group transmitted from a central station, the response equipment also including a keyboard for designating answers or responses to the questions, timing circuitry, circuitry for comparing a response to one or more designated answers to determine acceptability of a response, scoring circuitry, and a recording device for recording answers to the question. The recording device includes preferably a dispenser for dispensing a record such as a printout, or a magnetizable card containing a person's responses to the questions and/or a person's score in answering the questions.

A particular advantage of the invention is the capacity for interaction between a person conducting a broadcast program and the external audience. This may be illustrated by way of example wherein a sportscaster is describing a sporting event such as a football game. The questions asked by the sportscaster may pertain to the winning team, to plays that have been accomplished, as well as to questions which may be called in by telephone from the listening/viewing audience. During the program, commercials may be aired, and various products and/or services may be described and offered to the viewing audience.

In the practice of the invention, it is noted that signals of the instructional signal group, Group Two, may be transmitted before, concurrently, or subsequent to the transmission of the program signals in accordance with the nature of the questions and responses required. For example, in the event that the program situation deals with a college professor giving an examination, the correct or acceptable answers to the various questions and the procedure for scoring answers to individual ones of the questions can be transmitted before the lecture in which the professor asks the questions. In the event that a limited period of time is available for response to each of the questions, then, at least a portion of the instructional signals, Group Two, must be sent concurrently with the program data, this portion being a timing signal which the professor would initiate when he asks the question. The timing signal would initiate operation of a timer in the electronic equipment at each of the receiving stations which are tuned to the broadcast program, the timer then clocking a requisite amount of time in accordance with an instructional signal which has been previously transmitted or is concurrently transmitted with the program data. In yet a further example, in the case of an interactive situation wherein the professor is responding to

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a comment made by a student in the classroom or, possibly in response to a telephoned inquiry, the professor may then ask a question for which the instructional signal designating the nature of the response would be transmitted after the question has been asked.

At a receiving station the electronic equipment includes a response unit having a keyboard by which a viewer of the broadcast program enters a response. The response should be a desirable or correct response, or at least an acceptable response in order to receive credit. The response is stored in a buffer store for comparison with a correct or acceptable response which is stored in a data memory. One or more acceptable responses are provided as a data input to the data memory by the instructional signal group. The comparison is provided by comparison circuitry which outputs a signal via timing circuitry to a score counter to provide a score at the conclusion of responses to a question. The timing circuit, under control of a program memory, is activated upon request from the host of the transmitted program. Instructional signals transmitted by the host are modulated onto the audio portion of the transmitted signals and, subsequently at a receiving station, are demodulated and decoded to provide the data signals for the data memory, synchronization signals for operation of the timing circuitry, and instructional signals for operation of the program memory. Alternatively, the instructional signals may be transmitted at television frequencies by known methods, such as the use of vertical blanking intervals or other unused parts of a television transmission. The resulting score from the score counter may be recorded in a readout device which, in a preferred embodiment of the invention, provides a printout or a card with an encrypted value of the score in a magnetic strip that is readily read by automatic card readers. According to one embodiment, a register may be included for the storage of responses which are printed or typed out in the form of a message. The message may be passed on to the readout device under instruction of the program memory.

At each of the remote receiving stations, circuitry responsive to the third signals is provided for implementing the response criteria. In particular, provisions are made to evaluate responses to the same question at different difficulty levels. For example, different amounts of credit can be given based on the speed at which a viewer responds to the question. Also, answers showing a more detailed, accurate or comprehensive understanding can be weighted to provide greater credit for responding to the question. If desired, a set of response criteria may include only one difficulty level.

The readout or dispensing device provides a printout having at least two sets of information. The information may be provided on a tape or card in printed lettering and/or in a bar code format to show the value of any award which might be given, and a verification of the fact that the award has been made. The printout may also verify the identity of the person answering the question. The verification may be provided either by a signal transmitted from a central station as part of the instructional group of signals to be stored at the remote location or, alternatively, by use of a validation code taking the form of alphanumeric data and/or other symbols, such as a machine readable code, which the dispenser is capable of printing. The value of the award is printed preferably in alphanumeric form so as to be readily understandable by the participant.

In the event that a two-way cable system is available, such system may be used to advantage in the practice of the invention by providing for transmission of the television program to a remote audience while also enabling members of the remote audience to communicate responses or other commentary back to the broadcasting station.

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It is recognized that there may be situations wherein it is impractical to have communication of receiving stations with a studio at the central station at the time when the program is being generated. The invention would then be practiced by use of a further embodiment in which the program and instructional signals, including response criteria and scoring criteria, would be recorded for playback to the receiving stations at a later time. Such a situation might arise in the case of an educational program to be employed in a school, or to a program of general public interest which might be employed in a vehicle for public transportation, such as an aircraft. In the event that television is available at the receiving stations, the transmission and receiving equipment would be the same as that employed for the embodiment of the invention as disclosed above. However, in the event that only audio reception is possible, as by the use of earphones in an aircraft, then a verbal description of the task-setting situation would be provided, both the task setting and instructional verbal signals being recorded in an audio tape recording. Each of the receiving stations may be provided with a dispenser of hard-copy of results to responses to the task-setting message or, alternatively, a central dispenser may be used as in a classroom or aircraft, the central dispenser communicating via a digital communication system to response units at each of the receiving stations.

The transmission of a program, such as the playback of an audio-visual tape, may be initiated by a member of the remote audience through cable communication, including telephone. In such instances, a member of the home audience calls a dedicated number, such as a 900-number, and requests the playing of a tape. Such request may be made through a central operator or by dialing further digits of a dedicated number, associated with a specific tape or program selected by the caller.

In accordance with an important aspect of the invention, participants in the remote audience can designate an area of interest. This is particularly important with respect to an award received by individual ones of the participants, such that the award is related directly to a participant's area of interest. Thus, in the case of a game show wherein advertiser's products are displayed in various areas of interest, a participant of the remote audience can select a product area of interest and, subsequently, receive an award in the form of a coupon allowing him to purchase a product in the area of interest. This greatly increases a participant's interest in the game show. This feature of the invention also greatly increases the chance that a participant will employ his coupon, as by visiting the store of an advertiser to redeem his coupon.

A further advantage of this feature of the invention is that it can be implemented using the electronic communication systems employed in various embodiments of the invention, including the use of a central station to broadcast program material with its set of instructional signals and directives on the imprinting of a coupon. Furthermore, this can be employed using the electronic systems of the embodiments of the invention wherein the program and the instructional signals are prerecorded. This includes the prerecorded format in which recording apparatus may be located, for example, in an aircraft, or may be employed with participants in the home interconnected with a central station by means of a telephone network.

In terms of utilization of the foregoing electronic equipment, questions, instructions, and coupon imprinting directives are transmitted from the central station to the remote stations in a plurality of categories of interest. These cat-

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egories of interest are presented by the host in the communication transmitted from the central station. For example, in the case of a televised program, the categories of interest may be presented directly on the television screen. In cases wherein the program is transmitted by an audio channel only, then the categories of interest would be listed audibly by the host. The participants at the remote station by use of his response unit, presses a key on the keyboard indicating his selection of a desired category or area of interest. Thereupon, the response unit is responsive only to those questions, instructions, and coupon printing directives pertaining to the selected category of interest, and ignores the remaining questions, instructions, and coupon-printing directives as being irrelevant to the operation of the response unit. This is implemented readily by transmitting to the remote response unit, to be stored in a memory therein, the set of acceptable responses and the accompanying scoring criteria and advertising information for each area of interest. Then a respondent need only signal the response unit as to his desired area of interest, the signal serving to address the corresponding region of the memory. The response unit then operates with the data for the desired area of interest.

Normally, broadcast contests presently conducted are sponsored by manufacturers or retailers of products. Successful respondents may receive prize coupons entitling them to a discount on merchandise promoted by a sponsor. However, winners often receive coupons carrying a discount on merchandise they do not intend to purchase at the time they receive such a coupon. Discount coupons tied in this manner to an unwanted product will not be redeemed and are useless to both the public and the sponsor. It is a weakness of the coupon system presently in use that the overall coupon redemption rate is less than 4%.

The disclosed system and methodology provide for a dispensing of coupons to members of a broadcast audience for redemption, and enable members of the audience who have acceptably responded to a task presented in a broadcast to win a prize coupon carrying a discount deductible from the price of a product selected by such a member for purchase. Local sponsors thereby may promote the sale of products.

The foregoing coupons may be issued in conjunction with a broadcast television and/or radio program requiring an audience response wherein a part or all of the program is conducted in the form of a lottery, or other wagering situation, in which case the coupon identifies the winning entity which may be a lottery number, or the identity of horse in a horse race, or the identity of a player in a sports event. This is accomplished in accordance with a further aspect of the invention in which the aforementioned equipment can be employed for conducting a lottery game in a fashion which is resistant to forgery.

In accordance with the invention, there is provided a central data storage facility in which all player responses and, when desired, the winning response(s) are stored. Player entries can be authenticated electronically prior to storage at the central facility, and are transmitted either electronically (as by two-way cable, or by modem over a telephone line) from remote sites of players to the central facility. Authentication is accomplished by comparing numbers or names assigned to players, including serial numbers of player entry devices, with reference data previously stored in the central facility. Further authentication is provided by storing at the central facility data, such as the player's response and the winning number(s), which appears also on the coupon presented for redemption. At a redemption center, an electronic communication link with the



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central facility permits instant comparison of the two sets of data to verify the authenticity of the coupon and prevent fraud. The central facility may be connected to the remote stations and to a credit agency by means of a telephone network which permits verification of a player's line of credit, and a charging of lottery fees against a preestablished credit limit.

In accordance with a further aspect of the invention, numerous central stations, such as television and/or radio stations, may be linked together with a common base station and numerous telephone hubs by a communications system to form a network of broadcast stations serving a much enlarged audience wherein members of the audience are located at their respective remote receiving stations. The network is ideally suited for presentation of network programs of general interest, such as a sweepstakes and other prize events, to the enlarged audience by interspersing relatively short programs in time slots between segments of regularly scheduled disparate broadcast programs from the central stations. The base station provides program material for retransmissions via the central stations of the network. The network program, for any one time slot, may be in any one of a number of forms, particularly a contest having a duration in a range of time extending from less than one minute up to possibly several minutes for presentation on television or radio. The network broadcast may take the form of a well-known network communication commonly employed today for news programs communicated across the country from the base station simultaneously to local broadcasting stations for retransmission to home radios and televisions.

The individual programs are transmitted one after the other from the base station in a sequence extending for the duration of a program, or throughout the day. Each of the network programs occupy a predetermined time slot within a program sequence wherein the times of occurrence of the various programs as well as, possibly, the contents of programs, have been made known previously to the manager of the central station. Each central station is free to select specific ones of the network programs for rebroadcast in accordance with the program scheduling of the individual central station. This provides freedom for the host of the central station to employ network program material which may be live or previously prepared.

A great advantage of the invention is that the use of the network program material interspersed among local programming material allows people across the country to participate simultaneously in a common contest, or a common learning experience, or in a common national survey, by way of example. The use of alternative network programs inserted in opportune time slots allows the central stations to insert the network programs within the regular broadcasting schedules of the respective central station in a manner similar to that of the usual interruption of a broadcast program for a message from an advertiser or sponsor. Thereby, the invention allows for the simultaneous participation of people from across the country to be accomplished without need for any significant rescheduling of local programming.

Many people in the broadcast audience can participate by responding to tasks or questions set forth in the network program by use of electronic or telephone hubs which facilitate entry of the large number of responses, as well as to evaluate and authenticate the responses. Furthermore, valid responses meeting response criteria may also be communicated by telephone link from each electronic hub to a central station for conduction of a sweepstakes. Responses

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can be evaluated at one or more central sites by use of evaluation equipment which may be located in the electronic hubs or, alternatively, evaluation can be accomplished at the individual receiving stations by a response unit. The use of the remote evaluation is particularly advantageous because a common evaluation facility allows the sweepstakes or other form of network program to be conducted without need for specialized equipment, other than a radio or television and a telephone, at a participant's receiving station.

#### BRIEF DESCRIPTION OF THE DRAWING

The aforementioned aspects and other features of the invention are described in the following description, taken in connection with the accompanying drawing wherein:

FIG. 1 is a simplified diagrammatic view of a system incorporating the invention and configured to show two embodiments of receiving stations, one receiving station employing simulcast radio and television signals of a program produced in a studio, and the second receiving station employing a television receiver system modified to receive an instructional signal from the studio;

FIG. 2 shows the audio spectrum and a portion thereof designated for an instructional signal;

FIG. 3 is a detailed diagram of the system of FIG. 1;

FIG. 4 is a block diagram of an electronic response unit in each remote receiving station of FIGS. 1 and 3;

FIG. 5 is a block diagram showing details of a dispenser of FIG. 4;

FIG. 6 shows an embodiment of the invention, similar to that of FIG. 3, the system of FIG. 6 employing the transmission of two signal groups each having plural sets of signals, wherein first and second signals of the first signal group are transmitted by video and audio portions of a television program, the first and the second signals presenting respectively a studio scene and a task for respondents, and wherein two sets of signals of the second group, an instructional group, are combined with an audio signal of the first group;

FIG. 7 is an alternative embodiment of the system of FIG. 6 wherein the signals of the second group are interleaved with the video signal of the first group by use of the vertical retrace time slot of a television transmission;

FIG. 8 is a block diagram of a response unit for use with either of the systems of FIGS. 6 and 7;

FIG. 9 is a block diagram of a timing unit of FIG. 8;

FIG. 10 shows the audio spectrum and a portion thereof designated for instructional signal bands of the second signal group utilized, respectively, for answers and criteria for evaluating answers;

FIG. 11 is a diagrammatic view of receiving stations of the invention installed, as a further embodiment of the invention, in an aircraft with separate receiving stations located at each passenger seat, this embodiment employing a recording of a game situation with instructions for response, each receiving station being equipped for both audio and video;

FIG. 12 is a block diagram showing interconnection of electric components of the system of the invention for the installation of FIG. 11, the system of FIG. 12 employing response units having components disclosed in FIG. 8;

FIG. 13 is a block diagram showing a modification of the central station of FIG. 6 to provide for an audio-only recording of the game program for use by the receiving stations of FIG. 11;

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FIG. 14 is an alternative embodiment of FIG. 12 for use of an audio recorder, the system of FIG. 14 employing a recording provided by the system of FIG. 13, the system of FIG. 14 employing response units having components disclosed in FIG. 8;

FIGS. 15 and 16 show a modification of the systems of FIGS. 13 and 14, respectively, wherein the central station and the response units of the receiving stations have been modified to be operative with response-criteria and scoring signals transmitted as unintelligible audio signals in the same audio band employed by the recorded audio description of a task-setting program and the audio instructions for response to the task;

FIG. 17 is a simplified diagrammatic view of the invention showing both the central station and a receiving station in which an audio recorder having four separate channels is employed, the channels communicating audio signals for task and instructions, for synchronization, for response criteria, and for scoring criteria;

FIG. 18 shows additional equipment which may be incorporated in the response units of FIGS. 11, 12, 14, and 16 for communication of scoring results by a digital communication system to a central dispenser for a hard-copy output of game results;

FIG. 19 is a timing diagram showing burst transmissions of response and scoring criteria between voice signals for an audio-only recording employing a single recording track;

FIG. 20 is a timing diagram showing simultaneous transmission of voice, synchronization, response and scoring criteria signal in an audio-only system employing a multiple track recording medium;

FIG. 21 shows schematically an alternative embodiment of the invention wherein the tape recorder is provided with five channels to allow separate and independent recordation of a verbal description of a scene and verbal instructions for responding to tasks presented in the scene;

FIG. 22 shows diagrammatically a further embodiment of the invention wherein a respondent can activate a prerecorded program by use of a telephone, the prerecorded program including a task, questions, instructions for responding, response criteria, and signals enabling automatic comparing of answers to predetermined responses and a scoring of responses by a response unit;

FIG. 23 shows diagrammatically a further embodiment in the transmission of an instructional signal from a central station to a remote receiving station by use of an optical link in combination with the video portion of a television transmission;

FIG. 24 is a diagram explaining operation of a telephone system of FIG. 22 for use in debiting and crediting a respondent;

FIG. 25 shows diagrammatically the storage of information in two of the memories of the response unit of FIGS. 8 and 26;

FIG. 26 is a block diagram of a response unit which is a modification of the response unit of FIG. 8;

FIG. 27 is a flow chart for operation of a computer in the response unit of FIG. 26;

FIG. 28 is a diagram showing a sequence of steps in the practice of the method of the invention;

FIG. 29 is block diagram of a further embodiment of the invention wherein a central station and a set of remote playing stations are employed to conduct a wagering game including the issuance of coupons, or other form of wagering record, in a forgery proof system;

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FIG. 30 is a block diagram of a playing station of the system of FIG. 29;

FIG. 31 is a flow chart showing method steps employed at various components of the system of FIG. 29 for practicing the forgery proof wagering game;

FIG. 32 shows diagrammatically a network of central stations and telephone hubs connected via a communications system to a base station with facilities for conduction of a sweepstakes;

FIG. 33 shows diagrammatically a transmission via satellite of a network program from the base station to the central stations of FIG. 32;

FIG. 34 is a timing diagram showing the generation of tasks of a base station network program in a sequence of time slots for interposition between regularly scheduled programs broadcast by central stations of FIG. 32;

FIG. 35 is a timing diagram showing the generation of network programs at the base station of FIG. 32 in synchronized time slots of differing lengths;

FIG. 36 is a block diagram of record playback and transmission equipment for use in the base station of FIG. 32; and

FIGS. 37-40 are flow charts showing different configurations in a process of utilizing the equipment of the network of FIG. 32.

#### DETAILED DESCRIPTION

In the following description, FIGS. 1-5 disclose embodiments of the invention useful for programs to be conducted with participation from remote audiences. In the disclosure of FIGS. 6-10, the system is adapted for a greater selection of, and modification of, parameters in criteria for evaluating answers to questions. The criteria are controllable from a central station. A level of difficulty in the questions may be selected by a contestant. The embodiment of the system of FIGS. 1-5 is described in terms of two signal groups, namely, a radio/television signal group, Group One, and an instructional signal group, Group Two. The embodiment of the system of FIGS. 6-10 is described with reference to at least four types of signals, namely, a television signal presenting a studio scene (TV program), a television signal presenting a task such as a set of questions (task signal), a signal setting forth acceptable answers to questions (response criteria), and a signal setting forth criteria to be employed in the evaluation of the answers (scoring mode). In FIGS. 11-22, there is shown a set of embodiments of the invention wherein an event, scenario, presentation, situation or other scene having a task to be performed is recorded for subsequent playback to respondents. The system of FIGS. 1-5 will be described first, this being followed by a description of the system of FIGS. 6-10 and the system of FIGS. 11-23. The systems of the various embodiments will now be described primarily in the context of responses to tasks and questions; it being understood that the practice of the invention is applicable to the making, evaluation and rewarding of predictions. Methods and systems employed in the context of predictions of the outcome of events are more particularly described in connection with FIGS. 22 and 24. The remaining figures show still further embodiments of the invention.

FIG. 1 presents a simplified description of a system 10 wherein a central station 12 includes a studio 14, such as a television studio which broadcasts programs to many external or remote receiving stations, two such receiving stations

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16 and 18 being shown by way of example. In accordance with the invention, each of the receiving stations 16 and 18 includes means for observing the broadcast program, such as a television screen 20, and means by which persons in the external viewing audience can respond to situations presented in the studio, the response means being a response unit 22 which evaluates and records responses entered by persons in the viewing audience.

Two signals are broadcast by the central station 12 to each of the receiving stations 16 and 18. One of these two signals is a program signal for presenting on the television screen 20 a program generated in the studio 14. The second of the two signals is an instructional or command signal for operation of the response unit 22, the instructional signal providing appropriate commands to the response unit 22 for evaluating, rejecting or accepting, and scoring audience responses to questions raised in the televised program.

Two modes of transmission are provided for the two signals. In the case of the receiving station 18, both of the signals are carried by a single television channel carrier radiated from an antenna 24 of the central station 22, and received by an antenna 26 at the receiving station 18. The antenna 26 connects with a television system 28 which includes the foregoing television screen 20 and, furthermore, includes circuitry 30 for the separation of the instructional signal from the program signal. The instructional signal is then applied via line 32 to the response unit 22. In the case of the receiving station 16, the two signals are processed separately. The instructional signal is broadcast by a radio channel employing a radio antenna 34 at the central station 12, and received by an antenna 36 at the receiving station 16. Thus, at the receiving station 16, a standard television set 38 including the screen 20 receives the televised program via antenna 26 and presents the program on the screen 20. A separate radio receiver 40 and demodulator 42 are employed for receiving the instructional signal and for applying the instructional signal to the response unit 22.

In the practice of the invention, the instructional signal may be transmitted to a remote receiving station in any convenient manner such as via a cable transmission or by a specially broadcast transmission (not shown) or by combining the instructional signal with the audio signal in a radio broadcast or television broadcast. The combination of the instructional signal with the audio spectrum is demonstrated in the graph of FIG. 2 which shows a typical relationship of amplitude versus frequency in a transmitted audio spectrum. In that spectrum, a relatively narrow frequency band is set aside for transmission of the instructional signal, the narrow frequency band being at the upper frequency edge of the audio spectrum.

For example, the bandwidth of the instructional signal may be approximately 1% of the audio bandwidth, this being sufficient to enable a relatively slow transmission of instructional data to the response units 22 in the respective receiving stations. By maintaining the amplitude of the instructional signal well below that of the audio signal, the instructional signal does not introduce more than a negligible amount of interference with the audio signal. Also, it is noted that the instructional signal is not continuously present but, rather, appears only for a momentary burst of time, typically less than a few seconds duration, when necessary to instruct each response unit 22. In the case of the receiving station 16, a simulcast of radio and television is employed while, in the case of the receiving station 18, only the television program is broadcast, as has been described above. However, in both cases, the audio spectrum is the same, and the mode of combining the instructional signal

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with the audio transmission is the same. Typically, the system 10 would be implemented with only one of the transmissions, either the television transmission with the instructional signal combined therewith, as demonstrated by the receiving station 18, or by the simulcast of both the television and the radio transmissions as demonstrated by the receiving station 16. In the case of the simulcast, the instructional signal need not be combined with the television signal, the instructional signal appearing only in the radio broadcast from the antenna 34 as described above.

The receiver 40 and the demodulator 42 operate in a manner similar to that of the separation circuitry 30, and will be described in detail hereinafter, with reference to FIG. 3.

In both of the receiving stations 16 and 18, the response unit 22 includes a keyboard 44 whereby a person in the remote viewing audience enters a response. The response unit 22 includes a dispenser 46 which dispenses a record of the score and/or responses in a permanent recording medium such as a card 48 of plastic, or similar material, and including a well-known strip of magnetizable material (not shown) upon which the score and/or responses have been recorded. Alternatively, by way of example, the dispenser 46 may be constructed in a form (not shown) for outputting a tape which has been imprinted or punched with the desired information. Easily recognizable indicia may also be imprinted on the tape or card.

The system described lends itself well to multi-part questions and/or to multiple choice answers, for any of which special forms can be provided, to be filled in or otherwise marked. The response recording and/or data entering means can have provisions for the insertion of special forms or blanks, which can be made available or mailed to participants. For example, a school may mail to students forms specially prepared for a particular examination or assignment. The response unit 22 may therefore be configured to hold a recording medium such as a paper blank to which markings are applied. Alternatively, the medium, such as paper tape, discontinuous or continuous forms, may be inserted by the respondents.

Examination papers, whether taking the shape of forms to be filled in, or the result of a free hand composition or narrative, may also be graded by the comparator means, which is capable of identifying key phrases and words that are expected to appear on the completed examination paper. In similar fashion, comparator means to be described hereinafter is designed so as to be able to recognize and accept any one or more of a plurality of predetermined key words, symbols or phrases.

Dispenser 46 can be adapted to reward children who have provided answers meeting the predetermined response criteria by dispensing gold stars or other tokens. In another embodiment, the dispenser combines the coupons issued to winners with advertising material or shopping hints.

The records created pursuant to the present invention may be used as tokens, coupons, certificates and general proof of participation in the broadcast transmission program. Coupons may be redeemed by mail or in retail establishments for cash, prizes or discounts.

The following terms are useful in describing the system of the invention.

The term "task-setting" is intended to include the meaning of interrogative, opinion-eliciting and statement-eliciting, as well as the soliciting of creative endeavors and all kinds of functions capable of being performed by an entry in a data entering device.

The term "comparing" relates to one or more possible established responses which may be established prior to or

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subsequent to a contestant's response (the previously known color of a golf ball, or during a game, a prediction of how close the ball will come to the hole), and a comparing of an actual response to an established response to determine if an actual response is acceptable. An acceptable response may be based on one or more words or phrase or alphanumeric symbol or selection of designated objects, by way of example.

The terms "evaluating" and "scoring" are intended to refer to and include the meanings of sorting, counting, screening, evaluating, analyzing and processing information, data and responses in accordance with predetermined criteria, ranging from simple comparing tasks to computerized processing and analyses.

The term "interactive system" refers to a system for communicating from a sender to a respondent and having the capacity for allowing the sender to respond to a communication, when desired, from the respondent whether by manual or electronic means.

The term "response" is intended to include answers, elicited opinions and statements, text and narrative provided by contestants, respondents, students and other participants in broadcasts calling for interaction, reaction and responses.

The term "response criteria" is intended to refer to descriptive words, key words, key phrases, parameters, equations, formulas, symbols and definitions describing or defining responses that have been determined by the producer of a program to be acceptable in the context of a task so as to qualify for a reward. The term "response criteria" is intended to include one or more acceptable answers. As an example, in response to a question having four multiple-choice answers, the answers 1 and 2 can be stipulated as acceptable, so that no comparison or evaluation per se is required. Similarly, the terms "compare" and "evaluate" are intended to include determinations of the acceptability of responses in which an acceptable response is specifically prescribed without requiring a comparing or evaluation step.

The terms "outcome criteria" and "success criteria" are intended to include alphanumeric symbols and data by which the outcome of an event can be described, measured or identified, such as key and descriptive words, coordinates, grid, pinpointed and other locations, pictorial, diagrammatic and graphic presentations, results, scores, counts, records, distances, rates and other measurements.

The term "processed response" is intended to refer to and include the results produced by screening, sorting, scoring, evaluating, massaging, statistically analyzing, or otherwise machine-processing responses, data and information provided by participants at the receiving stations.

The term "hard copy" is intended to refer to and include any kind of permanent record capable of being visually read, scanned or machine read. The term "matrix" may be used to refer to the source or origin from which something originates, takes form or develops, such as a cellulosic or plastic strip capable of being provided with printed markings or magnetic recordings so as to create a hard copy record. The term "simulcast" is intended to refer to the simultaneous, but separate transmission from different propagating sources of the video and audio portions of a program.

In the context of formulating response criteria, the terms "formulate", "generate", "format" and "reformat" are intended to refer to and include the selection and determination of all factors affecting the evaluation and scoring of responses.

In the case of a task requiring a prediction of the outcome of an event which has not yet occurred or been completed,

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such as the completion of a forward pass in a football game, or winning a hand at a card game such as bridge, the response criteria may be referred to as outcome criteria. The outcome criteria is to be transmitted to contestants at remote stations at a time after the prediction has been made.

In the context of transmitting response criteria, for example, on an audio frequency, the use of the term "encoding" is intended to include various forms of signal coding as well as a transmission of signals at an increased speed which would render the signals unintelligible to the human ear. The term "encoding" as used by way of example for transmitting response criteria, is intended to include other modes of communication such as various forms of color signal coding and transmission of signals to television stations capable of being read by sensors of devices for receiving signals outside the audible frequency range. The transmission of encoded information, whether within the audio spectrum or within the visual spectrum, is to be accomplished preferably in a fashion which is essentially unnoticed by a contestant and cannot be perceived as conveying information. In this sense, the encoding is perceptually unintelligible.

The term "keypad" is understood to include other forms of data entry devices, the keyboard being presented by way of example.

The term "print-out" is intended to include printed, embossed, punched, stamped, and other types of hard copy, paper, cardboard and plastic in the form of coupons, certificates, tokens, cards, forms and matrices. The printing of the print-out includes the foregoing forms of marking including the creation of three-dimensional configurations.

The term "central" as used, for example, in "central station", is intended to refer to a broadcast station or network serving a country, a time zone or a region, and also is intended to include discrete local broadcast stations operating independently and serving a town or other smaller geographic area, always provided that such "central" station serves a multiplicity of remote receiving stations. It need not be at the geographic center of the region served.

The terms "remote" or "external" as used for example in "external audience", are intended to include all television viewers and radio listeners tuned into an electronic transmission station, irrespective of the distance from such central station; as such, a "remote" audience includes, for example, students or other respondents positioned in close proximity to the source of a program, as in the case of a closed circuit transmission.

The term "interval" is intended to mean time interval or period of time.

The terms "code", "encoding", and "encryption" are intended to include alphanumeric codes, color codes, bar codes and symbols, including those readable, recognizable or conveyable by humans and machines.

The terms "acceptable response" or "acceptable answer" are intended to include all answers to a question, which answers meet or exceed a minimum standard or degree of accuracy, comprehensiveness or responsiveness; such acceptable answers specifically including partially correct answers. Answers may be defined as "acceptable" irrespective of a level of difficulty or a scoring mode.

The term "commercial message" as used herein includes sponsored, paid-for and other messages intended for commercial purposes.

The term "user" of a recording medium as used herein includes viewers, listeners, and buyers of a recording medium such as video tapes, and the target audience intended to be reached by the commercial message.



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The term "intelligible" is intended to mean intelligible to a human without machine intervention, for example, without decoding, demodulation, change of transmission or receiving speed, or other manipulations to make a signal intelligible to humans. The term "intelligible" includes material which can be seen or heard such as written material or speech. The term "unintelligible", as applied to various signals which may be transmitted by equipment employed in the practice of the invention, is intended to include signals which can be made intelligible only by machine intervention.

The terms "multipart task" or "multipart question" are intended to include any situations, such as questions, tasks and puzzles, in which a contestant is required to provide chronologically spaced responses related to a common question, task, puzzle, or subject matter requiring an action by the contestant. Such a task may include so-called umbrella or omnibus questions comprising sub-groups, contingent questions (e.g. "if the answer is "true", then proceed to . . . ) and sub-questions derived from a parent question.

The term "reward" is intended to include in its scope discounts, prizes, free merchandise, monetary awards and other rewards having monetary or symbolic value. A "sweepstakes award" may be a special award of extra value beyond the value of a typical award.

The term "host" is intended to include an on-stage and an off-stage announcer, master of ceremonies, program director, guest host and celebrities, announcers of commercials and any other individual associated with the program or appointed to carry out one or more of the activities enumerated herein. It also is intended to include the individuals engaged in the operation of formulating a message or program for broadcasting on behalf of an advertiser, manufacturer, store or sponsor.

The term "difficulty level" is intended to include difficulty levels set by the host and inherent in the task or question, as reflected by possible answers, as well as difficulty levels inherent in a response or answer set by a respondent based on the speed, accuracy, comprehensiveness or responsiveness of the response and reflecting respondent's confidence in his or her knowledge of the subject matter. Similarly, a "difficulty level" may apply to the outcome of an event, as reflected by possible predictions.

In the formulation of a response to a question by a member of the external television audience, in the ensuing description reference will be made to a response in terms of recognition of key words as well as responses which require several words as in a phrase, sentence, formula and the like. It is to be understood that, in the generation of such responses, the term "word" includes also alphanumeric characters and other symbols such as pictorial representations which may be required as a proper response to a question.

With respect to various embodiments of the invention, the response unit 22 may be configured to provide the foregoing functions of evaluating and scoring, as well as the processed response.

In FIG. 3 the studio 14 is shown, by way of example, to include a television host 50, conducting a quiz program or game 52 in front of a television camera 54 which views both the game 52 and the host 50, and, also including when required, display means on stage (not shown) to provide an image thereof, which image is televised or only visible to the studio audience. Words spoken by the host 50, as well as other sounds in the studio 14, are converted by a microphone 56 to electric signals.

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Also included within the studio 14 is a keyboard 58 by which the host 50 or another person, may enter commands and instructions to be communicated via the instructional signal. The central station 12 further comprises an encoder 60 a modulator 62, an oscillator 64, a band-pass filter 66, a summer 68, a combiner 70, a radio transmitter 72, a television transmitter 74, and a switch 76. The switch 76 connects an input terminal of the combiner 70 to either an output terminal of the summer 68 on line 78 or an output terminal of the microphone 56 on line 80.

The instructional signals may be prerecorded and then propagated from a central transmission station to remote locations. In such a case, the host uses the keyboard (or other such device) to initiate the transmission of the instructional signal message.

In operation, the pressing of keys on the keyboard 58 activates the encoder 60 to output digital signals representing the keys which have been pressed. The oscillator 64 outputs a carrier signal which is modulated by the modulator 62 with the digital signals outputted by the encoder 60. The modulator 62 applies the modulated carrier signal to the filter 66 which narrows the bandwidth of the modulated signal to equal the instructional bandwidth shown in FIG. 2. The filtered signal is coupled from the filter 66 to one input terminal of the summer 68, a second input terminal of the summer 68 receiving the output electrical signal from the microphone 56 via line 80. An output signal of the camera 54 is connected to one input terminal of the combiner 70, either directly or via a video mixing unit (to be described with reference to FIG. 23). To facilitate the explanation of this embodiment of the invention, it is presumed now that the camera 54 is connected directly to the combiner 70. A second input terminal of the combiner 70 is connectable via the switch 76 in line 78 to an output terminal of the summer 68. In the alternative position of the switch 76, the second input terminal of the combiner 70 is connected via line 80 to receive the output electric signal of the microphone 56 rather than the output signal of the summer 68. An output terminal of the combiner 70 is connected to the television transmitter 74. Signals outputted by the summer 68 are connected via line 78 also to the radio transmitter 72.

The signal outputted by the band-pass filter 66 is the instructional signal which is to be transmitted via either the transmitter 72 or 74 to a remote receiving station. The signal outputted by the microphone 56 is the audio signal component of the signals transmitted in the television channel via the transmitter 74, and is also transmitted via the radio transmitter 72 to the remote receiving stations when a radio transmission of the audio portion of the activity in the studio 14 is desired. The summer 68 performs the function of combining the instructional signal with the audio signal whereby the instructional signal shares a small fraction of the audio spectrum as shown in FIG. 2. This is accomplished by adding the output signals of the microphone 56 and the filter 66 to output the sum signal on line 78. The combiner 70 functions, in a well-known fashion, to combine the video portion of the television channel signal from the camera 54 with either the microphone signal on line 80 or the composite signal of the summer 68 depending on the position of the switch 76.

In the event that the simulcast of both the radio and the television transmissions is to be provided by the transmitter 72 and 74, the switch 76 connects the combiner 70 to line 80 in which case the television signal transmitted by the transmitter 74 has the standard format of video and audio portions without the instructional signal, the latter being transmitted via the radio transmitter 72. In the event that the switch 76

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is connected to line 78, then the television signal transmitted by the transmitter 74 includes the instructional signal within the audio portion of the television signal.

The circuitry of FIG. 3 demonstrates two possible embodiments of the invention wherein the receiving stations may have either of the two forms shown for the remote receiving stations 16 and 18. If all of the receiving stations have the form of the station 16, then the switch 76 may be placed in the position for connection of the line 80 to the combiner 70, in which case the transmitter 74 transmits a normal television signal while the instructional signal is transmitted by the transmitter 72. In the event that all of the receiving stations are in the form of the station 18 then the switch 76 connects a line 78 to the combiner 70 for providing a modified form of the transmitted television signal wherein the instructional signal is included within the television signal. In such case, the radio transmitter 72 is not used by the invention, but may, nevertheless, transmit a radio program to remote radios which do not form a part of the system of the invention.

The television system 28 comprises a receiver 82, a demodulator 84, and a speaker 86. The separation circuitry 30 comprises a narrow-band filter 88 and a demodulator 90. The passband of the filter 88 is equal to the bandwidth of the instructional signal shown in FIG. 2.

In the operation of the receiving station 16, the receiver 40 functions in the manner of a well-known radio receiver for receiving the radio transmission incident upon the antenna 36. In addition, the receiver 40 includes a narrow-band filter 92 having a passband equal to that of the filter 88. Thereby, the filter 92 extracts from the audio spectrum the portion of the spectrum, shown in FIG. 2 designated for the instructional signal. The signal outputted by the filter 92 is demodulated by the demodulator 42 to recover the digitally formatted signal produced by the encoder 60, which digitally formatted signal is applied to the response unit 22 for providing instruction thereto. The television set 38 in the receiving station 16, as noted hereinabove, functions in accordance with the well-known form of television set outputting both audio and video signals, the latter appearing on the screen 20.

In the operation of the receiving station 18, the receiver 82 includes a well-known television tuner (not shown) and outputs the television signal of the channel to which the receiver 82 is tuned. The television signal outputted by the receiver 82 is demodulated in a well-known fashion by the demodulator 84 to provide a video signal which is presented on the television screen 20, and an audio signal which is presented by the speaker 86.

In accordance with a feature of the invention the demodulator 84 also applies an audio signal to the filter 88 of the separation circuitry 30. The filter 88 extracts the portion of the audio spectrum designated for the instructional signal, as does the filter 92, and outputs the instructional signal to the demodulator 90. The demodulator 90 operates, as does the demodulator 42 to recover the digitally formatted signal produced by the encoder 60, which digitally formatted signal is applied to the response unit 22 to provide instruction thereto. Thereby, the response units 22 of the receiving stations 16 and 18 are able to function concurrently with the presentation of the broadcast television program upon the television screens 20. As indicated in the drawing for the receiving station 18, a member of the normally remote audience 94 operates the keyboard 44 of the response unit 22 while listening to the speaker 86 and watching the television screen 20.

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With reference to FIG. 4, there is shown one embodiment of the response unit 22 of FIG. 3. The circuitry shown therein accomplishes the major functions of the response unit 22, namely, providing a member of the audience 94 with a means for entering a response to a situation viewed on the television screen 20 and/or heard via the speaker 86, not accepting (rejecting) or accepting, evaluating and scoring such response, recording such response, and outputting a temporary or permanent record of the response. In particular, it can be advantageous if the permanent record is in the form of the card 48, which form is machine readable to facilitate a reading of the score and/or response by either a third party or the host 50. It is to be understood that the circuitry of FIG. 4 constitutes only one possible embodiment of the invention for performing these functions and that other embodiments employing a digital computer suitably programmed (not shown) may also be employed.

The response unit 22 comprises three decoders 96, 98, and 100, a register 102, a score counter 104, a memory 106 for storing data, and a memory 108 for storing an operating program, a timer 110, a gate 112, a buffer store 114, a comparator 116 for comparing output signals of the store 114 with the memory 106, a logic unit 118, and a clock 120, these components being in addition to the keyboard 44 and the dispenser 46 disclosed previously with reference to FIGS. 1 and 3.

In operation, the memory 106 stores data with respect to the answers which are to be provided by the viewing audience. For example, in the event that the viewing audience is composed of children in a children's show wherein children are learning to identify colors, the host may point successively to a red hat, a blue table, and a green car and request to know the colors of the respective objects. In such case, the memory 106 would store response criteria, in this instance, the words red, blue, and green in the sequence corresponding to the order in which the objects are to be addressed by the host. The keys on the keyboard 44 may be similarly colored to enable entry of the correct response. Alternatively, for older children, the keyboard may be an alphanumeric keyboard, as is found on a typewriter, in which case the viewing audience is to type the words corresponding to the colors addressed by the host. In this case, the comparator 116 would compare the spelling of the words entered via the keyboard 44 with the spelling of the colors stored in the memory 106. The buffer store 114 stores the responses entered via the keyboard 44 to enable the comparator 116 to compare the response with the data stored in the memory 106.

The method and system of the invention lend themselves particularly well to educational shows for children. Questions pertaining to educational toys, to books, to stories and to subjects being taught or addressed, are interspersed in the show. Children are rewarded with tokens or other forms of award, such as coupons redeemable at candy stores, ice cream parlors, and the like.

The score counter 104 operates under command from the program memory 108 to score each correct response signal outputted by the comparator 116. When the response entered at the keyboard 44 agrees with the data stored in the memory 106, the comparator 116 outputs a logic-1 signal via gate 112 to the counter 104. The output signal of the comparator 116 serves as an enable signal to initiate a count by the counter 104. The counter increments its count by 1, 2, 3, or other amount depending on the magnitude of the score to be awarded for the correct response. In the event that the response is to be timed in the sense that a limited time is available for the response, then the timer 110 is activated by

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the program memory 108 to render the gate 112 in a state of conduction of signals of the comparator 116 only during the interval of time when the response is permitted. Both before and after this interval of time, the timer 110 places the gate 112 in a state of nonconduction so that a response entered at the keyboard 44 outside of the desired response interval, or "window", cannot enable the counter 104 to increment or modify the score.

The output count, score, or evaluation of the counter 104 is applied to the dispenser 46 which includes a recording medium, such as the card 48, for providing a permanent record of the score. The dispenser 46 includes suitable magnetic recording heads (not shown) for recording information on the card 48 in a well-known fashion. In addition, if desired, the dispenser 46 may include well-known encryption circuitry for recording the score on the card 48 in a fashion which cannot be read except by an automatic card reader having circuitry for decrypting the recorded message. The dispenser 46 is activated by the program memory 108 to accomplish the foregoing recording of the score.

The score counter/evaluator 104 can take different forms. While the score counting function is described herein for illustrative purposes, it should be understood that unit 104 may be designed to perform the processing of data entered by respondents on keyboard 44 or other data entering device. Included in such processing are, for instance, the computerized processing of data provided by respondents in accordance with one of several programs stored in memory 108 and brought into play by the instructional or command signals transmitted by transmitters 72 or 74. Questionnaires or forms used in market research may be stored in dispenser 46 or may be placed into it by respondents. Following a set of questions, or upon the completion of the broadcast, processed or unprocessed data are issued by dispenser 46 in the form of hard copy taking the form of one of the embodiments described.

If desired, the actual response entered at the keyboard 44, such as the words red, blue, and green of the foregoing example, may be recorded by the dispenser 46. For this purpose, the responses are coupled from the buffer store 114 to a register 102 wherein the responses are stored prior to recording at the dispenser 46. After all of the responses have been stored in the register 102, the program memory 108 strobes the register 102 to pass the data of the responses into the dispenser 46 for recordation upon the card 48 or such other form of storage media as may be employed.

The printout mechanism or marking device may take different forms to meet the requirements of the broadcast, whether quiz programs, educational programs, tests surveys or other task setting assignments. These devices may be relatively small, utilizing a continuous tape as the substrate to which the markings are applied, or they may utilize full page printouts. The recording medium may be a special form or blank dispensed individually by the device as a cut section, or may take other configurations, including discontinuous shapes.

Although completely blank forms may be used in recording respondents' entries in the data entering device, in many instances the forms or blanks preferably are provided with lines, grids, schematics and the like for easier subsequent scoring of responses recorded on such forms or blanks.

To prevent tampering, forging and counterfeiting, the recording medium may comprise material, such as paper or cardboard stock, plastic and the like, of special composition or containing admixtures of identifiable substances facilitating recognition by electronic or other sensing and scanning devices.

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Verification may also be facilitated by using recording media that are colored, coated, embossed, textured, magnetized or otherwise given recognizable properties.

By replacing the recording media, such as rolls of paper tape, periodically, and by stipulating redemption of the record thus created within a specified time period, the unauthorized reproduction, tampering with and counterfeiting of the marked recording media can, for all practical purposes, be prevented.

The marking may be applied by any known methods, including printing with or without impact, using ink sprays, heat, magnetic pulses, laser beams and other light sources. The markings may also take the form of depressions and embossed configurations legible by appropriate devices.

In addition, to prevent tampering, the recording mechanism, such as a printer, can be provided with means for alternatively and selectively applying one of a plurality of different types of markings. As an example, the color, intensity, width, spacing, positioning, font and resolution of the markings may be built into the recording means and may be controlled by radio or other electronic command signals from a central station.

The shape and configuration of the markings to be utilized at any particular time and subject to change at any time, includes numbers, letters, dots, dashes, regular and irregular shapes, codes, symbols and other configurations, which may be discrete, connected or continuous. The markings may also comprise shapes and configurations having no discernible pattern and readable only by appropriate scanning, reading or decoding means.

The number of combinations and permutations of the above mentioned properties of the recording media and markings is so large as practically to preclude tampering, forging, altering, counterfeiting or reproduction of authentic records; the unauthorized manufacture of special composition paper alone, would be far too costly and particularly time consuming to be practical.

According to a feature of the invention, with respect to preventing the forging of prize winning coupons, a would-be forger is denied use of the printer to accomplish forgery.

As an illustration, a TV-viewer having a response unit (as described above) in his home, is provided with two materials or matrices to form hard copy outputted by the dispenser. For example, the matrices may be a paper tape comprised of 100 coupon sections, which tape is fed into the printer of the response unit, and a verification card having 100 spaces or boxes. The coupons and the card have the name or other identification of the TV-viewer imprinted thereon. Codes can be provided on both the tapes and cards. The paper tape and the verification card are tamper-resisting in various ways. Both can carry time limits for redemption. Tapes and cards provided to TV-viewers, say monthly, can for example have a 30-day limit for redemption. In view of the special composition of the tape and the card, their duplication by a forger would be impractical, because special paper or cardboard would have to be manufactured. The individual coupons and the spaces or boxes on the card carry identical consecutive numbers.

Each time a winning coupon is presented at a redemption center, the winner of such a prize is required to present the verification card. The numbers on the winning coupon and on the card are compared to verify their matching. When the coupon is redeemed, the corresponding space or box in the verification card are canceled or invalidated by any one of many known methods, such as marking, punching, tearing off, stamping and the like. When 100 coupons have been



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presented, both the paper tape and the verification card have been used up.

By the method described, forging of coupons alone is rendered useless. Frequent changing of the properties of tapes and cards by the operator of the system and the multiplication of obstacles faced by a would-be forger are so great as to make forging practically impossible.

A similar system can be employed when using magnetized cards in lieu of paper coupons. The magnetized card of a winning contestant is provided with identifying indicia and codes, the verification card carrying matching markings and codes. The redemption procedures are similar.

If magnetized cards are used and validated by dispenser, the validation may be erased at the time a card is presented for redemption, so that it may be reused.

It is noted that the data to be stored in the memory 106 is provided by the instruction signal on line 122 or 124 from the demodulators of the receiving stations 16 or 18 shown in FIG. 3. The digital format of the instructional signal is decoded by the decoder 96 to extract the portion of the signal relating to the data which is to be stored in memory 106. The decoder 98 decodes that portion of the signal which is to be employed for presetting the timer 110 for the designated interval of response time. The decoder 100 may be coupled directly to the memory 108, or via an OR gate which will be described with reference to FIG. 23. To facilitate the present explanation of this embodiment of the invention, it is presumed that the decoder 100 is connected directly to the memory 108. The decoder 100 decodes that portion of the instruction signal which presets the memory 108 to any one of a number of previously stored formats for responding to situations presented in the studio 14. In this regard, it is noted that the form of the instructional signal follows common communication practices wherein the instructional signal is set up as a sequence of digital words or fields which identify respective portions of the message dealing with data, timing interval, and program commands. Thereby, the decoders 96, 98 and 100 are able to recognize the specific parts of the instructional signal and to extract the requisite data and commands. The response criteria may consist of a simple requirement to be met by a respondent or may comprise a plurality of independently variable factors.

The control logic 118 operates in response to a succession of clock pulses provided by the clock 120 for outputting control function signals to the memories 106 and 108 and to the buffer store 114. A connection between the keyboard 44 and the logic unit 118 provides for a control function, such as an entry command whereby a person responding directs the store 114 to enter the data inputted by the keyboard 44. The control logic of the unit 118 may also be activated by a command from the program memory 108. Thereby, the response unit 22 is capable of receiving, scoring, and recording a response entered by a member of the audience at a remote receiving station.

The construction of the foregoing system of the invention permits its use in numerous situations involving participation wherein members in the external audience are to participate with members of the studio audience in situations requiring participation. An example of the utility of the system may be demonstrated by considering a television game/quiz show involving both people at home as well as in the studio. The invention makes it possible to broadcast quiz show permitting home viewers to become participants and contestants. The invention is applicable to a variety of present and future game shows.

As an illustration, a game show or quiz program may include the task of listing, in reverse chronological order, the

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names of all teams having won the baseball World Series, or the World Soccer Championship. A time limit is set which makes it impossible for contestants to enter all correct answers; this is common practice in aptitude tests.

There are five contestants on the studio stage. Each studio contestant is equipped with well known means to write, print, type or otherwise enter his or her response on a board, keyboard or other data entering device adapted so that the responses, in the process of being entered, may be projected on a screen or screens visible to the studio audience, but not to the contestants and not to the home viewers until the predetermined time limit has been reached, or until the time allowed has substantially been consumed. The responses of studio contestants can be displayed to the studio audience and to home viewers with some delay, thereby preventing any of the home contestants from benefiting from the answers of the stage contestants.

It therefore is an object of the system described to elicit responses from contestants at remote sites and to capture their responses in their data entering devices essentially before the responses given by stage or studio contestants become known to home contestants. This is accomplished by projecting the questions on a screen hidden from studio contestants but in view of the camera 54 of FIG. 3. Concurrently with, or prior to the projection of the questions, the host 50 employs the keyboard 58 to transmit instructions to the response units 22 of the remote audience. The response entered by a participant in the remote audience is timed and is subject to a time limit, the time period to conclude before the questions are presented to the studio contestants. Thereby, the responses of the remote audience are not influenced by the responses of the studio contestants. Keyboard 58 may be operated by a person other than the quiz show host and may be situated on-stage or off-stage.

In a simple version, the system can be employed to attract viewers and listeners not normally disposed to participate in game or quiz shows per se, but willing to answer a few unobtrusive questions, especially if pertaining to a subject of interest to the viewer. By responding to questions, a home viewer can, in effect, act as a contestant. The questions to be answered by home viewers and radio listeners can be interspersed in shows other than quiz shows and can be so simple as to require essentially only a confirmation by participants of being tuned in to a particular program.

Thus, for instance, home participants may be asked to identify the soap opera character who earlier appeared in the program. Or home viewers of a sports program may be asked to name a player who just scored. These implementations of the system and accompanying awards to a correct answer are intended to increase the television and radio audience. Viewers of a soap opera or persons listening to a radio sports broadcast, constitute a highly targeted audience and as a result of the lower per-household cost, advertisers will be able to award more valuable coupons and prizes to successful respondents. Participants who have given an acceptable answer can be rewarded with a coupon of defined value to be redeemed in cash, or to be applied to the price of a specified product or to the price of any product in a specified retail outlet. Other forms of rewards, whether of commercial or symbolic value, may be devised.

Advertising material, such as shopping hints and promotional material may be provided on hard copy records as coupons, prior to the delivery of the matrix, for example a paper tape, to participants at remote locations; or the advertising material may be provided and printed on the coupons at the time at which other data, such as prize information, is provided thereon.

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The latter method has the advantage that a sponsor or advertiser can have up-to-date promotional information printed on coupons by directing the station which transmits instructional signals to remote locations to include in such signals the desired advertising material. A last-minute-telephone call by an advertiser to the sub-carrier station with directives to incorporate certain instructional signals in the sub-carrier transmission will result in a large number of shoppers being alerted to "special sales" through up-to-the-minute coupon promotions.

The quantitative results obtained by this method can also be used in the statistical analysis and the reactions of audiences tuned in to certain programs. It is noted that the equipment of the invention may well be installed in numerous selected or random households in which case, responses by household members can readily serve as a bases for statistically sampling peoples' responses to a product, service, political candidates, corporate images and other subjects of surveys. The increased audience provided by the invention is significant in survey and market research fields because, by way of example, an increase of sample size from 2000 to 2 million will reduce a sampling error from 3% to 0.1%.

In the field of qualitative market analysis and consumer research, the system and methods described can be employed very effectively, substituting home viewers and listeners for the so-called focus groups or other population samples used to determine buyer responses to products and services. The versatility and flexibility of the home keyboard or other data entering device are particularly well suited to the elicitation of unbiased responses to questions or statements by advertising agencies and market analysts. The market research and other surveys and polls made possible by the system and methods described, can be part of a regular quiz show or can be conducted separately. Respondents are rewarded for their cooperation by issuing certificates, coupons and the like to them. The permanent records produced by the dispensing means in remote locations can be mailed to the research organization. For this purpose the forms dispensed by the dispensers in participants' homes can take the form of self-addressed return envelopes. Special printed forms may be used in conducting research into respondents' reactions to tasks or questions. Coupon awards may be dispensed separately or may be a tear-off section of a survey form.

The relative simplicity and compactness of the electronic devices comprising the response unit, and the fact that the response unit is not connected by wire and requires no installation, makes it possible to design the response unit as a portable unit. A plurality of such units may be placed in systematically or randomly selected homes, used for the desired research purposes and thereupon moved to new locations. The units may be battery powered to provide mobility for use at private or public locations.

For the implementation of game/quiz shows, the following advantages of the invention are noted. The system of the invention does not require any wiring or rewiring of a home nor the use of telephone lines, and may be offered to viewers free of charge. In the context of the disclosed embodiment, a telephone is suggested merely as a convenient and rapid means for interaction between respondent and host, but is not required to practice the invention. For example, the external audience might be located in a separate room within walking distance from the studio in which case interaction can be accomplished personally by allowing a member of the external audience to walk over to the studio. The system permits home viewers to participate in quiz shows on the

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spur of the moment without advance notice and without any requirement for special forms or entry blanks. The system can be superposed upon a variety of game and quiz shows to permit viewer participation without interference with existing show formats, and has the advantage of expanding the television audience, thereby attracting sponsors of the shows. The machine readable card 48, or a one-time coupon which may be outputted by the dispenser 46, may be presented or redeemed for prizes by successful participants at a local store or other business establishment cooperating with the broadcaster.

When applying the methods and systems described to a multi-part task, contestants normally are confronted with a situation, such as questions or puzzles, in which a plurality of entries on the response entering device are required, the total of the responses determining the correctness or acceptability of a contestant's response.

While such an event or operation of such a task is in progress, the responses, entered piecemeal, as well as the applicable response criteria, are stored at contestants' locations. In a game show situation, one unacceptable answer may eliminate or disqualify a contestant from winning a prize. The task may be presented all at once, or in parts presented successively and calling for a partial response to each partial task.

The comparison and scoring means can be programmed to perform their functions at each stage of the task, upon completion of the entire task, or following a group of partial tasks. The printer/dispenser normally is programmed to operate at the end of all responses by a contestant to a multi-part task.

The system provides simplicity in the administration of the game by identification of the successful respondents; this is readily accomplished at the dispenser 46 in each remote location by imprinting each card 48 or token with the name of the respondent. If desired, the name of the respondent can also be inputted at the keyboard 44 as are other answers to questions. The questions may include multiple-part questions and may require multiple choice answers, if desired. The questions may require simple answers such as yes or no, a single word such as a number or a color, or a plurality of words as in a phrase or narrative. Operation of the score counter 104 for various choices of answer permit a scoring of partially correct responses and those meeting a predetermined response criteria. In its simplest form, the keyboard may be provided with only two keys to answer yes or no, while in a more complex form, the keyboard may include the alphanumeric character keys for entering words or phrases, as well as other symbols.

If, as an example, a respondent must select a number from the numbers 1 through 9, and if the completely accurate answer is 5, the comparator unit may be programmed so as to accept any number between 4 and 6, or 3 and 6, etc.

The response entering device 44 may be provided with keys, buttons, levers, or other means for indicating a response, which response can have an assigned meaning. It may be a shorthand entry, standing for a word, a phrase or a sentence. A response unit may be constructed as a dedicated unit for a specific purpose as for playing a game, in which case a key may generate a specific type of response or responses.

By way of alternative embodiments of the invention, it is noted that the comparator 116 may output a multiple-bit digital word wherein the additional bits are provided by the memory 106 dependent on the specific answer stored in the memory 106, which answer is compared to the response

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within the buffer store 114. For example, if two possible responses would be regarded as correct, but one of the two responses is preferred, then the comparator 116 would output an additional bit for the preferred response. The additional bit would be passed by the gate 112 to advance the count of the counter 104, thereby to increase the score by a larger amount when the preferred response is entered at the keyboard 44.

The formatting and reformatting can provide for various ways of weighting the responses of home contestants, such as straight line additions, geometric and exponential progressions, or computations of scores based on formulas incorporating discrete groups of responses. Thus, score counter 104 may be replaced with a microcomputer (not shown) which is responsive to commands from the memory 108 for combining inputs from keyboard 44, memories 106 and 108, and capable of reflecting the time element, to serve, in effect, as an evaluator of complex answers.

According to the present invention, questions may be transmitted from the central station, to which more than one acceptable answer may be given, the answers varying in the degree of difficulty from the respondent's standpoint. As an example, a question may call for naming a minimum of two European cities, the names beginning with the letter M, this being difficulty level 1. Difficulty level 2 might call for four such cities and difficulty level 3 might call for six such cities, all answers to be entered within 30 seconds. The particular difficulty level may be specified by the person controlling the transmission, or it may be selected by the individual respondent prior to seeing or hearing the question. In order to enable a contestant to choose a difficulty level, the host may announce or hint at the general nature, or the context of the question about to be asked. The degree of difficulty will normally determine the value of the prize, etc. The device evaluating the responses may dispense records, e.g. coupons, certificates and the like of different value or in different denominations. For instance, it may issue a 10 cent coupon at level 1, and 25 cent coupon at level 2, and a 50 cent coupon at level 3. The coupons may be redeemed in retail establishments, the coupons being similar to those contained in newspapers. It should be understood, therefore, that in addition to the difficulty level set by the host, a higher difficulty level may be superimposed by an individual contestant, as will be disclosed subsequently with reference to FIGS. 6-10.

By use of encryption, the card 48 provides an essentially tamper-proof record. The invention is applicable, not only to home viewers but also to viewers in a public establishment such as a restaurant or school wherein people may participate as teams. The questions may be graduated to be suitable for a variety of audiences varying from those having limited formal education to those having special interests. By use of the timer 110, the studio host can designate the beginning and end of a response interval, and vary the time limit allowed from question to question. In addition, the invention lends itself to the development of further forms of game and quiz shows. The difficulty level can be increased by decreasing an allocated time for response.

It should be understood that individual questions may vary with respect to the nature of the task, the type and particulars of acceptable responses, the difficulty level, the period of time allowed for responding, the kind and range of prizes, the weighting of responses, the composition of the target audience and other considerations.

It should be further understood that normally the announcements to remote participants of levels of difficulty

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and of time intervals allowed for responding to a task are transmitted and received in a form directly intelligible to participants, such as in open language. If an acceptable response criteria is transmitted, prior to entry of a response by a participant, it is conveyed in coded or otherwise unintelligible form; if it is transmitted subsequent to such entry, it may be conveyed in open language.

As an example in the use of the invention in the educational field, the memories of the response units at the remote locations receive and retain instructional signals from a central transmitting station conveying the correct, preferred, or acceptable response or responses to the task posed by the task-setting message. Upon completion of a task by a respondent, or upon lapsing of the allotted time, the printout mechanism is activated by the instructional signals so as to communicate or so as to dispense in hard copy form the correct or preferred response to each respondent at remote locations. In this manner, a student who receives a printout containing his or her scored response, also receives the "textbook" solution or most desirable response to the task presented. For comparison purposes, the dispenser may provide printed hard copy containing a student's original response.

The foregoing features in the operation of the system of the invention are readily applied to the educational field to encourage both early educational experiences among children as well as for home-study courses for high school and university students. In the educational field, the situation portrayed in the studio and presented on the television screen may be in the nature of a task-setting situation rather than that of a pure question. The appropriate response be a brief statement, an equation, or may contain a number of cross-referenced key words or key phrases or symbols. The system of the invention may be implemented also by closed circuit television and cable television as well as by the broadcast situation of FIG. 1. The keyboard 44 at each of the response units 22 may be a standard typewriter keyboard, as noted above, or may include a display of the typed response such as is presently available on some electronic typewriters. Such a display would be useful in the answering of examination questions for home-study programs. It is also noted that the keyboard 44 is representative of a response entry device, and may, if desired, be replaced by other entry devices such as a joystick, switches, or a device responsive to a spoken voice.

Response evaluation means referred to herein may include, when appropriate, as for example in the educational field, scanning devices capable of recognizing symbols, diagrams, charts, formulas, equations and drawings responsive to the response criteria.

In the practice of the invention, the answers given by studio contestants may, for instance, be displayed to the studio audience and/or broadcast to TV-viewers following a predetermined delay of, say 5-20 seconds. During this 5-20 second period, the data or response entering devices of the stage contestants, or the studio display devices, may be made inoperative, so that no answers may be entered and/or displayed, even if the stage contestants are aware of the questions. Other ways of staggering the "response windows" by 5-20 seconds or more can be devised.

This time lag is intended to make the answers projected on studio screens following the time lag useless to home contestants from the point of view of total time allowed for response. By the time the correct answers are televised, all or a critical amount of the allotted time will have elapsed. This forces home contestants to enter their responses before knowing the responses of studio contestants.



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By way of example only, a typical sequence of events as pertaining to a quiz show with studio and home contestants is as follows: TV home viewers and contestants see and hear the questions without delay. However, the questions are presented to stage contestants and the studio audience after a delay of 5-20 seconds. The respective contestants may begin answering questions upon their presentation, subject to time limits. Acceptable responses are presented to everyone, only after the stage contestants have completed their time for response.

To provide attention-attracting action on stage for the studio audience and TV-viewers who are not contestants, the announcer or master of ceremonies can set the stage for the questions, or a performer may walk across the stage to a podium and read the questions to the stage contestants and the audience, thereby consuming 5-20 seconds. The questions are displayed on a screen, visible to all TV-viewers, including home contestants. Other ways of giving home contestants a head start of 5-20 seconds, or more, can be devised. In another embodiment, the responses by stage contestants are entered, but not displayed for a predetermined period of time. Home contestants may be allotted more or less time than studio participants. If there is only one participant or contestant on stage, the quiz show still follows the concept outlined. The studio contestants and/or home contestants may be allowed a choice of different difficulty levels.

As an example, the use of key words and key phrases is illustrated in the context of a game show described herein-after, which might be entitled "Definitions". the host presents a situation, hints at, or announces a dictionary word and defines the task as one of providing the correct definition or definitions of such word. The dictionary definition, frequently a phrase, is of course an acceptable answer. Using the task word "many" as an example, an indispensable key word that would have to appear in any acceptable response would be the word "number". However, two or more definitions may exist for a task word.

It will be obvious that this type of show lends itself well to evaluating partially correct and less-than-exhaustive responses. Partial credit may be given to definitions that are reasonably close to the dictionary definition. A more complex task in the context of said show might be the definition of the word "set", for which a large number of definitions exist. Cumulative credits may be awarded to contestants listing a plurality of key definition words or phrases.

According to another show format, separate quiz programs for studio contestants and home contestants may be conducted concurrently by the same game show host. He or she may, for instance, conduct one quiz program for studio contestants in the manner described and while the studio contestants ponder their answers may present supplemental, or a separate set of, questions to home contestants, to which the latter respond in accordance with the method of the present invention. Such separate questions for home contestants may be posed by a second or off-stage announcer.

In the United States, Europe and other regions, television programs are frequently broadcast repetitively in different time zones. In the case of game shows, this enables television viewers who are tuned in to such program and who are in a time zone which first receives one such game or quiz show to inform members of an audience in another time zone of the correct responses to tasks or questions, thus ensuring such members in other time zones of winning an award without having independently correctly responded to such tasks. This potential problem resulting from a sequen-

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tial broadcasting of television game shows in the context of the present invention will now be addressed.

When the awards offered successful contestants are of a monetary value representing, say 10-15 percent of the price of the merchandise, and are designed only to attract buyers to a store, then a sponsor, such as a manufacturer, may choose to ignore the risk of, or may even welcome, having members of an audience in a first time zone provide members in a later time zone, who themselves did not think of the correct answer, with an appropriate response. Awarding such viewer a 10 percent discount is similar to making 10 percent discount coupons available through newspapers and magazines.

A more serious problem may arise when a sponsor or manufacturer offers awards of a larger magnitude. In such instances, it is desirable to employ a method, and such methods are hereinafter described, which permit airing a quiz or educational program presenting tasks or questions calling for different responses in different time zones. This is achieved by a modified version of the methods described above, which modified methods may be practiced with the systems described in this specification and accompanying drawings.

For example, a host or professor may stand in front of a map of the world. He or she verbally poses the question "In which country is the river to which I am pointing located?" For purposes of this illustration, the audio portion of the question, posed by an on-stage or off-stage announcer, is referred to herein as a "module question", and normally a quiz show or educational program comprises many such module questions. The object of formulating module questions is to be able easily and economically to substitute such module questions for each other in the same show, which normally is taped prior to airing. Such a module question, consisting of the audio portion of the question can easily and economically be replaced by another audio portion, while the more costly video portion (the host pointing to a map) remains the same.

In such a modified method, a part of all of a question or task presented in a program in one time zone, are differentiated and are different from the corresponding question or task asked in a similar program aired in another time zone. This is achieved by formulating at least a part of a question or task in interchangeable module form.

Either an entire question may be substituted in a program, or a part of a question may be substituted. If only a part of a question is to be substituted, such part can for instance be a part or all of only the video portion of a question. Normally, such interchangeable module questions will be of approximately the same length, so as not to affect the overall length of a program.

If a program comprises an entertainment portion and a game or quiz show portion, the part of the show consisting of questions or tasks may be produced and taped separately and independently of the entertainment of other portions of the show. Many forms of implementation of this method may be devised. The example given below is illustrative of only one of the alternative methods which achieve the above mentioned object.

According to a preferred method, a plurality of sets of different tasks is formulated, using one set of tasks in one time zone and another set of tasks in another time zone. Although the tasks may differ in their entirety, a preferred method is described wherein the tasks differ only with respect to their audio portion.

In the taping of the show, the video portion is the same in all tapes, irrespective of the time zone in which such

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program is to be aired or transmitted by cable. The audio and video portions together form a question or task. The audio portions of module questions change from one such program to the next. Thus the host or professor is seen in all versions of the show to be pointing to the same map. He or she will, however, tape a plurality of oral module questions, only one of these module questions being used in any one time zone. With reference to the above example, in which a host points to a map of the world, another module question may be "What is the name of the river?" Yet another such module question by the host, or off-stage person, may be "Is the river to which I am pointing among the five longest rivers in the world?"

The above described example involves the same host or professor asking a set of questions, each of which questions must be taped in its entirety. This necessitates the involvement of the host in asking a set of successive oral questions, while the video portion remains the same. In another version of this preferred method, the module questions, that is the audio portions of each question, are asked by an off-camera announcer. This method has the advantage that in the taping of the show, the host spends only sufficient time in front of the camera to ask one question, the host providing such action in front of the camera as is required to make the oral module question asked by the off-camera announcer intelligible. Thus, the host may silently point to an object, such as a map, for a length of time permitting an off-camera announcer to pose one module question. Other module questions asked by the off-camera announcer and accompanying the same video portion showing the host, are dubbed or inserted into the appropriate part of the tape. In the taping of a quiz show intended to be aired in four time zones, an off-camera announcer therefore asks four sets of module questions, one set of these oral questions being inserted into the appropriate place in each of the four program tapes used in transmitting the show in the four time zones.

According to a preferred embodiment of the above-described methods for use in the presentation of quiz programs in different languages, a host announces the oral module questions in one language. Different oral module questions are dubbed in, both in the language originally used by the host and in any other languages for use in different countries. In such an event the words and sentences chosen in formulating questions, are such as to lend themselves to dubbing. Also, the host when announcing some questions, can face towards a picture or a map, away from the viewing audience, in order to facilitate dubbing.

Thus the dubbing technique is an economical method of achieving the above-mentioned objective of utilizing the same video portions with a variety of different audio questions in different time zones.

Yet another example of a simplified version of the above methods may entail a projection of a scene or the filming of an object without a host being present. The object could be a well-known personality, or a picture of such personality; or an action shot of such personality may be used. An off-camera announcer may ask a number of oral or module questions to meet the requirements of the number of shows to be shown in different time zones.

The examples set forth are simple ones and many different and more complex versions and implementations of the home quiz show are possible and will occur to game show producers.

In some instances, such as in market research, the system described can be employed to identify consumers meeting certain criteria. In that event, the memory and control

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elements of response unit 22 are programmed in accordance with the requirements of the particular consumer research. Response unit 22 normally is placed in remote locations, which need not be homes and can be other private and public places. In an alternative application of the system, the response unit 22 is equipped with appropriate means capable of limiting the functions of the scoring and evaluation means. For this purpose, controls and switches (not shown) are provided, which cause memories 106 and 108, logic control 118, comparator 116 and gate 112 to selectively perform only those evaluating functions required for the specific application. In such an event, dispenser 46 receives only partially processed data and generates a record of responses entered on keyboard 44 reflecting responses evaluated only to the desired extent and at least partially resembling the original information entered by respondents. Respondents are rewarded in one of the manners previously described, including a monetary prize simply for participating in a test.

It is a particular advantage of the present system that the kind of data-entering device may vary between different remote locations. Furthermore, the kind of data entering, scoring or evaluating device installed at different locations may vary in accordance with the intended use. Thus, for instance, in selected remote locations, electronic devices of known design may be installed, which are capable of subjecting the raw data entered by respondents to computer analysis.

The invention may be practiced by providing two or more response units at each remote location together with one set of program presenting means. Providing more than one response unit, including means to modify a difficulty level and timing, and including comparison, storing, scoring and dispensing means in, for example, one household, enables two or more family members to become contestants by responding individually to a situation presented by a single television or radio receiver based on a program transmission from a central station. In a public place, a plurality of response units will generate increased and competitive participation by persons present.

FIG. 5 shows the buffer store 114, the register 102 and the program memory 108, as well as further details of the dispenser 46 of FIG. 4 to accomplish the imprinting of a response on a recording medium, such as a paper or card, having a prescribed format for the entry of answers. As has been noted hereinabove, such a data entry form or questionnaire, is useful for providing responses by respondents in situations such as contests, educational and advertising promotional or research activities. An example of such a questionnaire 126 is shown in FIG. 5. Therein, blocks numbered 1-6 are provided for entry of responses by members of the audience at the remote receiving stations 16 and 18.

Also shown in FIG. 5 is an enlarged fragmentary view of the keyboard 44, the view showing a keypad with keys for the entry of identifying numerals for identifying the blocks of the questionnaire 126 in which the respective answers are to be entered. The respondent identifies a questionnaire block by holding down a control key Q while typing the identifying numeral on the keyboard 44. The response to be entered in that block is then typed by use of the alphabet keys of the keyboard 44.

The dispenser 46 comprises a decoder 128, a printer 130 and a programmable read-only memory (PROM) 132. In operation, the typed answer and the questionnaire block identification is applied by the keyboard 44 and via the store



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114 to the register 102. The contents of the register 102, as described hereinabove, are subsequently transferred to the dispenser 46. The decoder 128 detects the presence of a digital word produced by the control key Q, and thereby decodes the incoming digital signals from the register 102 so as to separate the block identification from the response. The decoder 128 activates the printer 130, upon the appearance of the response, to print the response on the questionnaire 126, the latter having been previously placed into the dispenser 46 by the respondent. The decoder also addresses the PROM 132 with the block identification, whereupon the PROM 132 outputs the block location to the printer 130 to direct the printer 130 to print the response at the correct location on the questionnaire 126. Information with respect to the layout of the questionnaire 126 is loaded into the PROM 132 by the program memory 108 as directed by the instructional signal on line 122 or 124 of FIG. 4.

Alternatively, the block location data and the responses may be stored on the card 48 for printing out at another location, such as the facilities of an advertiser or a company providing the promotional activities. The response may include a narrative text, in which case the comparator 116 may be employed to signal the presence of key words in the response, which have been previously entered into the data memory 106.

By way of further embodiments of the invention, it is noted that the dispenser 46 may include a group of trays 134 each of which stores a separate set of forms such as the questionnaire 126 upon which a response is to be printed. The trays 134 are activated by a control signal from the program memory 108 to present a blank form to the printer 130 to be imprinted with the response. Information with respect to the desired form to be employed in response to a task-setting situation is loaded into the program memory 108 by the instructional signal on line 122 or 124, whereby an instructor or the host 50 in a classroom or in the studio 14 designates the requisite form for use in preparing the response. The completed form, or questionnaire 126, exits a slot 136 of the printer 130. The completed questionnaire 126 may be provided on any suitable recording medium which serves as a hard copy such as paper, plastic strip, or plastic card.

As was shown with respect to FIG. 4, the score counter 104 is under control of the program memory 108. This permits the score counter 104 to be activated and deactivated by commands transmitted via the instructional signal. In the outputting of the foregoing questionnaire 126 from the printer 130 with words printed in the appropriate blocks, a score can also be imprinted upon the questionnaire 126 upon activation of the counter 104, which score is omitted upon deactivation of the counter 104.

The embodiments of the system of FIGS. 6-10 provide further capability to the system of FIGS. 1-5 for conducting a quiz or game-type television show with both local and remote audience participation. The embodiments of FIGS. 6-10 provide for selection of difficulty level, evaluation of response based on key words and phrases, interaction between members of the remote audience and the program host as by use of telephone communication, and adaptation of the program by the host to the interaction by modification and reformatting of response criteria as by altering a basis or mode of scoring and a period of time allowed for response. As with the system of FIGS. 1-5, the present system of FIGS. 6-10 can also be employed with radio programs. Descriptive material relating to the program can be transmitted over the video and/or the voice channels of the television transmission. In particular, it is noted that much of

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the system description provided in FIGS. 1-5 applies also to the system of FIGS. 6-10 but, that additionally, the system description presented in FIGS. 6-10 shows the use of at least two separate signals, in the instructional signal group, for providing answers and evaluating the answers under control of both the program host and the remote viewer.

At the discretion of the television program conductor, or other person assigned for this purpose, and that of individual viewers, different difficulty levels may be applied to individual questions, it being understood that answers to more difficult questions or answers to the same questions at higher difficulty level may carry with them larger awards. However, even if only one set of response criteria is established for a task, it is understood that such response criteria carry a specified or implied difficulty level. Each successful respondent may be issued a printout or similar hard copy displaying the value of the award and containing a code which is verifiable over the telephone by a central station, or without the use of a telephone, by a cooperating store or merchandising center, for issuing an award.

FIG. 6 shows a further embodiment of the invention having greater versatility in the evaluation of learning situations and the scoring of games and contests by means of a system 200. In the system 200, a central station 202 includes a studio 204, such as a television studio, and broadcasts programs to many remote receiving stations, one such station 206 being shown by way of example. Each of the receiving stations 206 includes means, such as a television screen 208, for observing a broadcast program, and means by which persons in a remote viewing audience can respond to situations presented in the studio 204. The response means is shown as a response unit 210 which, as will be described hereinafter, includes circuitry for evaluating and recording responses entered by persons in the viewing audience.

A television program is conducted in the studio 204 by a host 212. While various types of programs may be employed in conjunction with the study of specific subject matter, for example, a course in advertising or packaging, in which there is a display of a specimen 214 of merchandise, or other subject of interest, to members of a remote television audience 216 located at the remote receiving stations 206, a game program employing a television game 218 is presented by way of illustration of the invention. The use of a game is a recognized technique in the teaching of children, as well as older persons, in a classroom. The object of the study or program, designated herein as specimen 214, might be an article, such as furniture or clothing, normally offered for sale, or other type of object such as a painting or animal in the case of study of such subject matter. For example, in a study of architecture, the "specimen" would be a model of a building, and in a home-study course of geography, the "specimen" would be a map or other teaching aid. In the case of services being offered, the specimen may take the form of an advertisement of such services. Each receiving station 206 is provided with a television system 220 which receives broadcast transmissions 222 of the televised game show for presentation on the television screen 208.

In the studio 204, the host 212, or an associate who may be off-camera, is provided with two keyboards 224 and 226, respectively, for entering appropriate responses to situations posed by the game 218 (response criteria) and for entering appropriate guidelines for scoring the responses (scoring mode). The response criteria may consist of specific delineating or parametric information. The game 218 and the specimen 214 are viewed by a television camera 228 which provides video signals for the broadcast transmission 222. It

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is to be understood that, in addition to the remote audience 216, a local or studio audience (not shown) may be present within the studio 204 for participating in the game 218. The host 212 addresses the local audience and the remote audience by means of a microphone 230, the microphone 230 providing an audio signal for the broadcast transmission 222. In this example of the television game, a first video signal is transmitted to the remote audience to present a picture of the game situation, this signal being followed, preceded or accompanied by an audio signal in which the host describes the task to be performed by the remote audience, which task may be the answering of specific questions in a designated fashion. As described above, when confronted with a time zone problem, one or more off-camera announcers ask a number of questions in the form of the oral or module questions, which module questions are then selectively inserted into the tapes of television programs to be broadcast successively in different time zones. Alternatively, the second signal describing the task may be transmitted over the video channel by use of a display in front of the studio audience, the display having the questions set forth in large lettering which is read readily.

With reference to both FIGS. 6 and 10, the central station 202 provides for a modulation of signals of the instructional signal group outputted by the keyboards 224 and 226 for the predetermined responses and scoring criteria within the audio channel to occupy narrow spectral bands in the upper portion of the audio spectral band. The system 200 is readily described in terms of four or more signals, the first signal being the television signal portraying activity in the studio 204. The second signal provides the description of the task to be performed by the studio and/or the remote audience. The studio scene and the task carried by the first two signals are presented diagrammatically in a typical time sequence by a graph shown alongside the camera 228, it being understood that the time sequence may be varied since the task announcement may precede or accompany the studio situation. The third signal carries the designated criteria for a response or range of responses entered by the host 212 upon the keyboard 224, such criteria being, by way of example, key words to be entered by the respondents. The fourth signal provides the scoring mode or guidelines entered by the host 212 upon the keyboard 226, such scoring being, by way of example, that an answer of the word "fish" is worth three points while an answer of the word "salmon" is worth five points. Additional examples of response criteria and scoring mode are discussed herein.

As example of a further signal, a fifth signal providing a verification code for use in verifying a printout of awards at a remote station may be sent subsequently along the same channel employed for transmission of the scoring criteria. The passbands of the third and the fourth signals, namely the response criteria and the scoring mode signals respectively, are indicated in FIG. 10, both of these passbands being much narrower than the passband of the audio spectrum, and carrying signal amplitude of relatively low levels, as compared to the audio signal, so as to avoid any interference with the transmission of the voice of the host 212. Since four separate signal channels are provided for the first four of the foregoing signals, these signals may be transmitted in any desired time sequence including a concurrent transmission of a plurality of these signals. One or more of the signals of the four channels may be retransmitted with an updated message, such as a reformatted scoring mode, to adapt the game program to new scoring instructions by the program conductor, or to audience responses, thereby to provide interaction between the host and the remote audience.

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The central station 202 further comprises two signal processors 232 and 234, the summer 236, a combiner 238, a transmitter 240 and two oscillators 242 and 244 coupled respectively to the processors 232 and 234. The microphone 230 is connected to a first input terminal of the summer 236. The processor 232 is connected between the keyboard 224 and a second input terminal of the summer 236 for encoding designated response signals outputted by the keyboard 224, and for modulating the signals onto a carrier frequency  $F_1$ , which carrier frequency lies in the response signal band of FIG. 10.

Similarly, the processor 234 is connected between the keyboard 226 and a third input terminal of the summer 236 for coding scoring mode signals outputted by the keyboard 226, and for modulating these signals onto a carrier frequency  $F_2$ , the carrier frequency  $F_2$  being within the score signal band of FIG. 10. The summer 236 combines the response and the score signals with the audio signal of the microphone 230 to output a sum signal to the combiner 238. The combiner 238 operates in a well-known fashion to combine the audio signal of the microphone 230 with the video signal of the camera 228 to output a composite television signal to the transmitter 240 for transmission via antenna 246 as the broadcast transmission 222.

Each of the processors 232 and 234 are constructed of the same components, these components being an encoder 248, a register 250, a modulator 252, a band-pass filter 254, and a clock 256. The operations of both of the processors 232 and 234 are the same and, accordingly, only the operation of the processor 234 need be described, it being understood that this description applies also to the processor 232.

In operation, the encoder 248 digitally encodes signals provided by respective keys 258 of the keyboard 226. The clock 256 outputs both a high speed clock signal and a low speed clock signal to the register 250. The high speed signal has a relatively high pulse repetition frequency for strobing bits of a digital signal outputted by the encoder 248 at a relatively high speed into the register 250. The bits of the digital signal are then outputted from the register 250 at a relatively low rate to the modulator 252 in response to strobing of the register 250 by the low speed clock signal. This arrangement of the high and low speed clocking allows a command to be entered at the keyboard 226 rapidly by the host 212, and then to be transmitted relatively slowly as a component of the audio signal. The slow transmission minimizes the requisite width of the score signal passband (FIG. 10). The modulator 252 may employ a suitable form of modulation as is commonly employed, such as amplitude modulation or phase modulation, for modulating the digital signal on the  $F_2$  carrier. The modulated signal outputted by the modulator 252 is then coupled via the filter 254 to the summer 236, the filter 254 limiting the spectral components of the modulated signal to the desired passband of FIG. 10. In the same manner, the processor 232 digitally encodes signals entered by keys 260 of the keyboard 224, and modulates the digitally encoded signals of the designated response upon the  $F_1$  carrier.

The television system 220 comprises a receiver 262, three demodulators 264, 266, and 268, a speaker 270, two band-pass filters 272 and 274, and two oscillators 276 and 278. Also shown in FIG. 6 is a telephonic circuit 280 including a telephone at the remote station 206 and a telephone at the central station 202 which enable interaction in the form of direct communication between a member of the remote audience 216 and a person at the central station 202. The telephone at the central station 202 enables members of the remote audience 216 to communicate, when desired, with